



way **TRACK** and

Hydraulic tool speeds pile driving

p. 28

November 1960

STRUCTURES

Special racks boost
track removal in panels

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BALLAST CLEANING

WITH

KERSHAW

MACHINES

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Two Kershaw Two-Wheel Kribbers, working in tandem, clean out all ballast from the center of the track and between the ties outside the rail. The Kershaw Tie-Bed Cleaner, equipped with special feet, then removes the ballast from beneath the rails, even in cemented ballast conditions.

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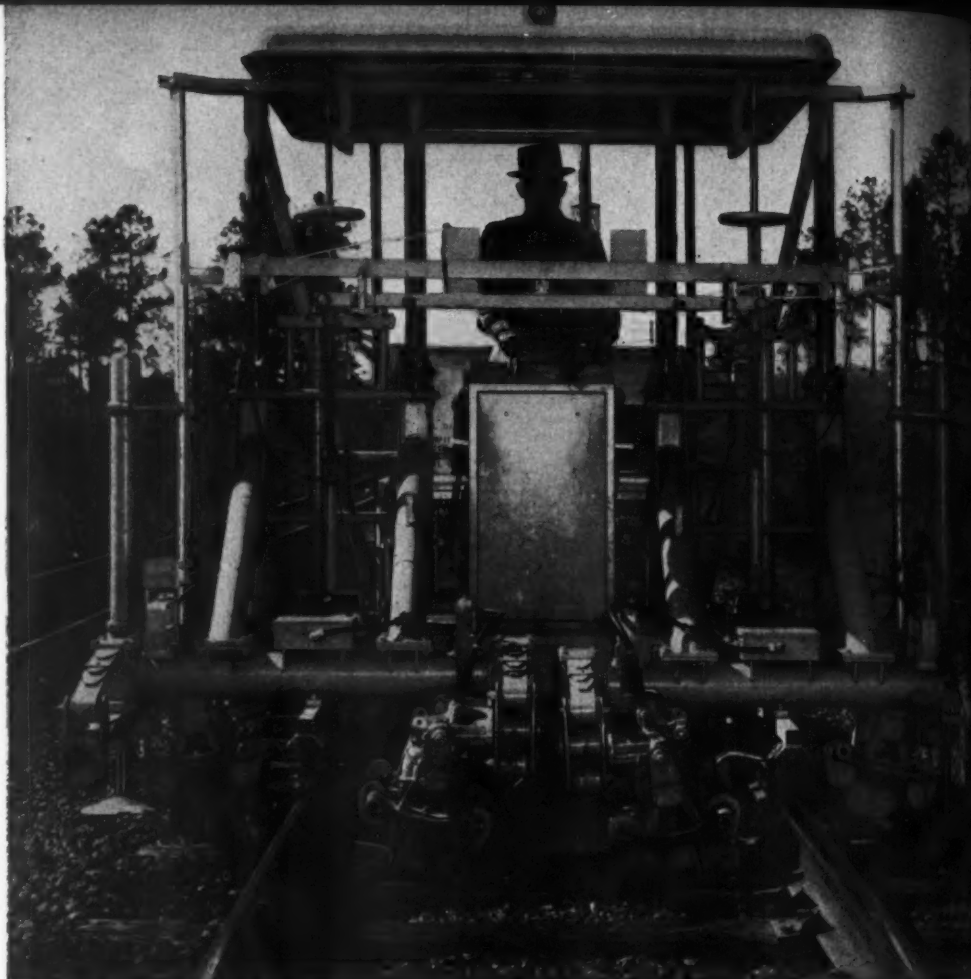


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THE
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JACK-SPOT
TAMPER**



1 THE JACK-SPOT HAS NOW THOROUGHLY PROVED ITS CLAIM TO BEING AN OUTSTANDING TRIPLE PURPOSE TAMPER.

2 TOPS FOR JACK TAMPING. It's exceptionally fast, accurate and positive in jacking to reach and hold the track raise and cross level. It quickly and firmly tamps tie to hold raise for production tampers and keeps out of their way. Adapted to existing track surfacing equipment.

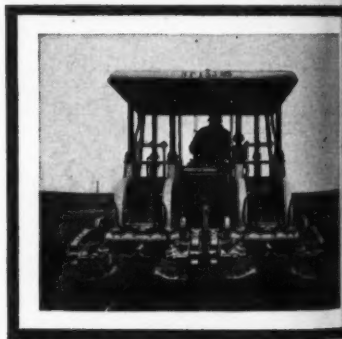
3 PERFECT FOR SPOTTING AND SMOOTHING. Great power and speed for spotting and smoothing in all ballasts and in all conditions is supplied by TRACK MAINTAINER tamping units.

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5 ALL PUSH-BUTTON OPERATED — ELECTRICALLY CONTROLLED . . . the most advanced machine of its kind to be found anywhere.

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Unmistakable leader in its field again in 1961. Offers greatest speed compatible with first quality tamping. Perfectly adaptable to all conditions . . . kinds and condition of ballasts and lowest to highest lifts. Achieves the longest-lasting, good-riding track qualities . . . bona-fide facts you can easily verify. Specify it for 1961.

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RAILWAY TRACK and STRUCTURES

Railroad M/W practices in Russia 23

Three pages of photographs show some of the things Frank R. Woolford saw last summer during a tour of the railroads in European Russia.

How PRR saves by undercutting tracks at bridges 26

A ballast cleaner is being used to undercut tracks at bridges where repeated raisings have created clearance or approach problems.

Hydraulic tool speeds pile driving 28

Describes how the Great Northern is increasing its pile driving output by using a deck-liner unit to shift stringer chords.

Special racks speed track removal in panels 31

A team of nine men and three machines on the New York Central is now capable of lifting and loading 60 panels a day.

Resins . . . What they are and how they're used in paints 32

New developments in coatings are explained in non-technical terms by R. E. Gwyther of the Sherwin-Williams Company.

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◀ Don't miss . . .

The Burlington recently completed construction of a 2500-ft bridge across the Mississippi river. About one-third of the bridge was erected using field rivets, the remaining two-thirds using high-strength bolts.

. . . in the December issue

Published monthly by Simmons-Boardman Publishing Corporation, 10 West 23rd St., Bayonne, N. J., with editorial and executive offices at 79 West Monroe Street, Chicago 3, Illinois; 30 Church Street, New York 7, New York. Subscription prices: to railroad employees only in the United States and Possessions, and Canada, one year \$2.00. Re-entry of second class privileges authorized at Newark, N. J., with additional second class privileges, Bristol, Conn. Volume 56, No. 11.



How To Place 1000 Ties A Day Without A Backache — Or A Cost Headache

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Piling old ties to be destroyed
Stacking usable ties to be banded
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SPECIFICATIONS FOR 57-BP TIE HANDLER

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POWER TRANSMISSION: Hydraulic.
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TRANSMISSION: 2-speed selective type.
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TONGS: Rotate 260°.
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BOOM: 5' or 7' intermediate section—optional—Extra charge.
BOOM: Travel—60° with boom parallel to track, 30° in either direction, up or down.
TRANSVERSE SET-OFF WHEELS: Optional—Extra charge.
CLEARANCE: Height—72". Width 65".
SWING: 6' 2" (measured from center pin).
WHEEL BASE: 60".
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Rail Drills • Cross Cutters • Track Liners • Bit Sharpeners
• Tie Nippers • Grinding Wheels • Tie Handlers

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RAILWAY TRACK and STRUCTURES

NOVEMBER, 1960

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**NEW
FASTER**

**McWILLIAMS
HYDRAULIC TAMPER**

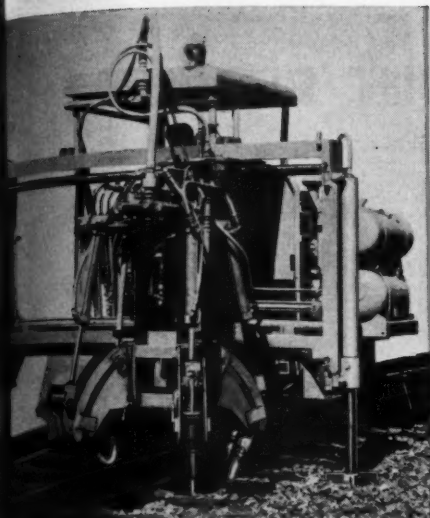
Combining completely hydraulic operation with proven quality air tamping, this new tamper has split head design and provides positive penetration and compaction under the rail-bearing area of the tie. The result: highest quality tamping at speeds up to 1100 feet per hour.

Track stays Up Longer with

Track tamped with these units will extend the surfacing cycle by 30% or more over other machines in use—in all cases, providing the lowest tamping cost per year. Write for new *Tamper Bulletin T-600*.

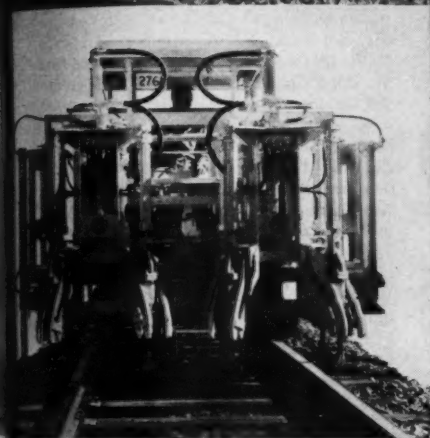
McWILLIAMS JACK TAMPER

Speed and ballast compaction are sufficient to keep ahead of multiple tamping—with no need for over-raising. Guns mounted either inboard or outboard the rails.



McWILLIAMS SPOT TAMPER

The most useful and the most widely used spot tamper, this fast, mobile machine delivers big-tamper ballast compaction.



McWILLIAMS MULTI-PURPOSE 8

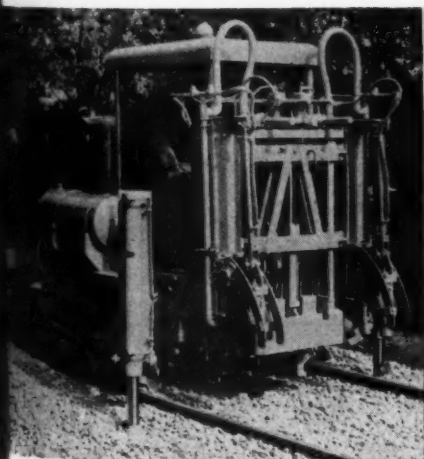
The world's most versatile tamper, this intermediate machine is a production tamper . . . a spot tamper . . . a jack tamper.

With a McWilliams Tamper

surfacing
in use—in
per year.

TAMPER

sufficient to
with no need
per inboard



and STRUCTURES

RAILWAY TRACK and STRUCTURES



Railway Maintenance Corporation

PITTSBURGH 30, PA.

NOVEMBER, 1960

9

ATLANTIC COAST LINE—**R. R. Pregnall, Jr.**, engineer maintenance of way at Savannah, Ga., has been appointed division engineer of the Richmond division, with headquarters at Rocky Mount, N. C. **T. C. Herndon**, engineer maintenance of way at Augusta, Ga., has been appointed division engineer of the Western Carolina division, with the same headquarters. **A. C. Parker, Jr.**, engineer maintenance of way at Jacksonville, Fla., has been appointed division engineer of the Tampa division, with headquarters at Tampa, Fla. **A. C. Low, Jr.**, engineer maintenance of way at Atlanta, Ga., has been appointed division engineer of the Western division, with the same headquarters. **L. H. Kelley**, roadmaster at Troy, Ala., has been promoted to division engineer of the Waycross division, with headquarters at Waycross, Ga. **J. L. Williams** has been appointed division engineer of the Ocala division, with headquarters at Ocala, Fla.

JERSEY CENTRAL—The Engineering and Property departments have been consolidated under the jurisdiction of Chief Engineer **B. J. Minetti**. **P. M. Parker** will continue as property manager.

LOUISVILLE & NASHVILLE—**M. A. McGee**, division engineer at Ravenna, Ky., has been transferred to Louisville, Ky., succeeding **R. C. Young, Sr.**, who retired recently. **W. P. Jones**, draftsman, has been promoted to assistant engineer on the Louisville division, at Louisville, succeeding **K. J. Ludwig** who has been transferred to the special engineer's office there. **J. Rosby Arnett** has been appointed assistant track supervisor at Mobile, Ala.

NEW YORK CENTRAL—**William J. Kernan**, district engineer at Syracuse, N. Y., as been promoted to assistant engineer maintenance of way, with headquarters at New York. Mr. Kernan is succeeded by **Charles T. Popma**, district engineer at Detroit, Mich., who is in turn succeeded by **Harry B. Berkshire**, assistant district engineer there. Mr. Berkshire is succeeded by **Paul K. Cruickshank**, division engineer at Jackson, Mich., who is replaced by **John C. Houston**, division engineer at St. Thomas, Ont. **William Baerthlein**, district methods engineer at Syracuse, has been promoted to division engineer at Chicago, succeeding **John Stang**, whose transfer to St. Thomas was noted in the October issue.

NORTH WESTERN—**L. E. McCosky**, assistant supervisor bridges and buildings at Green Bay, Wis., has been promoted to supervisor bridges and buildings at Eau Claire, Wis., succeeding **C. H. Sinclair** who is returning to his former position of assistant supervisor bridges and buildings at Milwaukee, Wis.

ROCK ISLAND—**D. C. Garstenberger**, fleet manager, Chicago, has been promoted to general supervisor work equipment there, succeeding **James Hops**, engineer work equipment, Chicago, who retired on September 30 after 34 years of service. **K. J. DeCamp**, assistant engineer work equip-



T. L. Fuller
SP



A. E. Cawood
New Haven



W. M. Jaekle
SP



W. J. Jones
SP

ment, Chicago, has been appointed assistant general supervisor work equipment there. **W. E. Roberts** has been appointed welding supervisor at Chicago.

SANTA FE—**J. W. Conroy**, division engineer of the Los Angeles Terminal and Harbor district, has been transferred to the Los Angeles division, succeeding **E. L. McDonald** who has retired after 43 years of service. Mr. Conroy is succeeded by **Raymond E. Clancy**, division engineer at Temple, Tex., who is in turn succeeded by **Joseph J. Parrish**, assistant division engineer at San Bernardino, Calif. **A. H. Renee, Jr.**, has been appointed roadway assistant at Los Angeles, succeeding **W. L. Paul** who has been promoted to assistant division engineer at San Bernardino, succeeding Mr. Parrish. **Andrew J. Dillard**, roadmaster at Dodge City, Kan., retired recently after more than 45 years of service. **Elmer C. Honath**, assistant division engineer at Amarillo, Tex., has been promoted to engineer of track design at Chicago, succeeding **Martin J. Zeeman** who retired on September 30 after 45 years of service.

SOUTHERN PACIFIC—**Thomas L. Fuller**, assistant engineer of bridges at San Francisco, Calif., has been promoted to engineer of bridges there, succeeding **Victor R. Cooledge** who has retired after more than 34 years of service.

Biographical briefs

Albert E. Cawood, 46, who was recently promoted to assistant chief engineer of the New Haven at New Haven, Conn. (*RT&S*, Aug., p. 10), was born at Lynbrook, N. Y., and graduated from Rensselaer Polytechnic Institute in 1937 with a Bachelor of Science degree in civil engineering. Mr. Cawood entered the service of the New Haven in 1935 as a rail inspector, subsequently serving as chairman, rodman, inspector, transitman and structural draftsman. He was promoted to bridge inspector in 1940, assistant bridge engineer in 1946 and engineer of structures in 1954. Mr. Cawood was further promoted to assistant to chief engineer in 1958, the position he held at the time of his recent promotion.

William M. Jaekle, who was recently promoted to general manager, Pacific Lines, of the Southern Pacific at San Francisco, Calif. (*RT&S*, July, p. 10), graduated from Stanford University in 1934. He entered the service of the SP in that year as a rodman. After various assignments, including that of assistant division engineer on both the Salt Lake and Western divisions, he was promoted to division engineer on the Rio Grande division in 1943, serving also in that capacity on the Coast division. In 1948 he was promoted to construction engineer on a line change in Oregon. Mr. Jaekle was advanced to assistant engineer maintenance of way and structures at San Francisco in 1951 and assistant chief engineer there in 1953. He was promoted to chief engineer, Pacific Lines, also at San Francisco, in 1955, the position he held at the time of his recent promotion.

William J. Jones, 45, who was recently promoted to engineer maintenance of way and structures, Pacific Lines, of the Southern Pacific at San Francisco, Calif. (*RT&S*, July, p. 10), was born at San Antonio, Tex., and graduated from the Texas College of Mines and Metallurgy in 1935 with a Bachelor of Science degree in mining engineering. Mr. Jones entered the service of the SP in 1940 as a rodman, subsequently serving as instrumentman, draftsman, junior assistant engineer, head cost analyst, assistant engineer and general track foreman, the latter at Colfax, Calif. He was promoted to assistant division engineer at Bakersfield, Calif., in 1944, serving also in that capacity at El Paso, Tex. Two years later he was appointed roadmaster at Lone Pine, Calif., later being transferred to Los Angeles, Calif. Mr. Jones was promoted to senior assistant division engineer at Ogden, Utah, in 1948 and division engineer at Sacramento, Calif., in 1951. Two years later he was advanced to assistant engineer maintenance of way and structures at San Francisco, the position he held at the time of his recent promotion.

John T. Collinson, 34, who was recently promoted to engineer maintenance of way of the Eastern Region of the Baltimore & Ohio at Baltimore, Md. (*RT&S*, Aug., p. 10), was born at Pittsburgh, Pa., and graduated from Cornell University in 1946

(Continued on page 58)



J. Jones
SP

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and STRUCTURES



You can bet your budget dollars...

UREABOR stops weeds

A low rate of application effectively destroys weeds and grasses... prevents regrowth. Easy to apply...nothing to mix...no water to haul.

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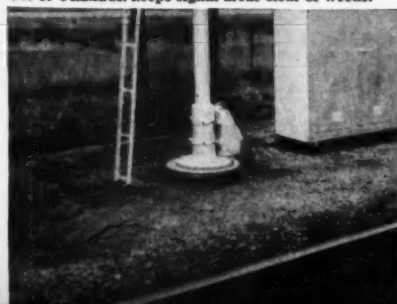
Use UREABOR to maintain weed-free yards for safety.



UREABOR protects trestles from fire-hazardous weeds.



Use of UREABOR keeps signal areas clear of weeds.



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As you may know, U. S. Borax & Chemical Corp. pioneered the field of dry herbicides... with particular emphasis on railroad requirements. Continuing research over the years has yielded our successful scientifically formulated herbicides. Each gives outstanding results on vegetation... each makes use of the proved plant-destroying action of borates. So, for *your* weed problems, get the right answers. Get in touch with us today to get the *most* for your weed-killer dollar!

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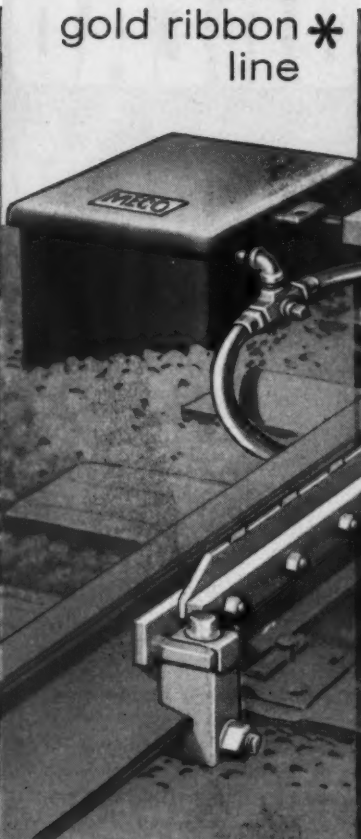
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includes:

**COST-CUTTING
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**MACK, REVERSIBLE
SWITCH POINT PROTECTOR**



**gives dependable care-free
lubrication everywhere it's
needed, automatically**

In modern railroading *everywhere* includes; grades, switch points, guard rails and running rails, as well as curves — *Everywhere* that friction-forces are at work, new "advanced design" MECO lubricators will reduce friction to a whisper. *Quadruples* the life of rails and wheel flanges!

MECO lubricators cost less to install—Attach to standard rail without special preparation. Once installed, a wheel-activated mechanism dispenses just the right amount of grease through the even-flow distributing bars directly to the rail and wheel flange for waste-free, care-free lubrication, automatically.

Ask one of our men to give you the extra-profit facts on the "gold-ribbon" MECO lubricator. Or write direct for full information.

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MECO
Maintenance Equipment Company

Roads getting 'plus' value from machines

Satisfied supervisors

Not too long ago a chief engineer of maintenance observed that he thought railroad supervisory officers in general were too prone to boast of their accomplishments and were getting too lax in supervising properly. He was speaking of all engineering officers from the chief engineer down. Undoubtedly, he was being severe in his criticism, but there is more than a germ of truth in what he said.

When supervisory officers are asked how things are going, he said, nine out of ten will reply "fine." Perhaps this reply is given without too much thought or because the officer had lapsed into the standard answer he gives whenever anyone inquires as to his health. At any rate, it infers that nothing seriously is wrong. The tenth man—the one who does not answer "fine"—has a problem, is aware of it and is devoting his attention to solving it.

Our chief engineer of maintenance questions whether it is advisable for supervisors to maintain an habitually satisfied attitude. When they go out in the field and observe work being carried out, should they look at only the things that are going alright, and then assume they have their job under proper control? Or, should they look for the things that are not being done properly or could go wrong?

It is his contention that supervisory officers, by the very nature of their positions, should be looking for ways for improving their properties and their methods of doing work. He would much rather have men who were never satisfied with the condition of their properties than those who are. He knows that men of the former type are assuming responsibility.

Some fundamental changes have been taking place in track maintenance practices as a result of mechanization. This is particularly true with respect to the amount of track surfacing being done. Using the advanced types of machinery available today it is possible for a handful of men to surface out of face a mile or more of track a day.

Indications are that the availability of this equipment has had the effect of greatly increasing the amount of surfacing work being done. Many roads are endeavoring to put their out-of-face raising and surfacing operations on a cycle basis and to do a spotting or smoothing job on the track between cycles. A practice that has grown rapidly in recent years is that of giving the track a light out-of-face raise, or "skin lift," which requires little or no ballast.

Track men on those roads that have been doing an increased amount of surfacing say the result has been to upgrade the riding qualities of the tracks from the standpoint of line and surface. It certainly can be expected to produce a more uniform track over an entire railroad. Track men also say that the practice of keeping the track in better line and surface has the effect of prolonging the service life of the rails and ties.

Here is a case where the railroads are getting a "plus" value from mechanization. Only a few years ago the output of a large surfacing gang could be measured in hundreds of feet a day. Now the production of a gang of only eight or nine men can be counted in terms of thousands of feet a day. The resulting sharp reduction in the cost has made it possible to increase the surfacing work done to an amount that old-time track men never dreamed would ever become economically feasible. In other words, whereas the mechanization of surfacing work was first undertaken merely as a means of reducing the cost of the relatively limited amount of such work then being done, the final result has been to give the railroads a new tool for improving the riding qualities of their tracks on a system-wide basis.

Like anything else, of course, track-surfacing, no matter how economical it may be, has its limitations as a means of maintaining the riding qualities of the track. It is not a cure-all for all track ills. There may be a temptation, for example, to use low-cost surfacing, involving the application of labor but little or no materials, as a substitute for new rail and cross-ties. As a temporary expedient this practice could, conceivably, be employed as a means of tiding over a piece of track with a bad tie condition. But such a practice, if carried too far, might prove more costly in the long run than correcting the basic condition.

Rail and tie renewals on the railroads as a whole have prevailed at extremely low levels for a number of years. Yet the standard of maintenance of most lines does not appear to have suffered appreciably. Perhaps this is partly because the railroads are doing more track surfacing than in past years. Eventually, of course, it will be necessary to strike a balance between the application of materials and of labor.

Fairmont

TIE PLUG INSERTER

**Now one man can insert 38 to 40 tie plugs
in just one minute!**

Speed up your rail renewal program, and cut the cost of manually plugging old spike holes, with the new, self-propelled Fairmont W104 Tie Plug Inserter—the industry's first mechanical device for setting and driving tie plugs.

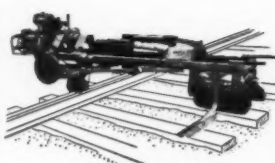
Compare the savings in time and money between slow, manual tie plugging, and the new, split-second, mechanical method. Plugging three holes per tie, one man and the Fairmont W104 can insert 38 to 40 tie plugs in just one minute. And compare the difference in workmanship and quality between plugs set and driven by hand . . . and plugs set and driven uniformly with one strong hydraulic blow of the Fairmont W104.

Any way you compare it, the new Fairmont W104 Tie Plug Inserter can save you money and man-hours—and give you a better job in the bargain! Plan now to put the Fairmont W104 to work with your rail gangs. Call or write for full information.

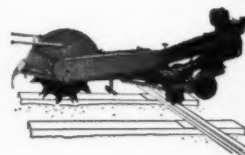
Fairmont equipment is available on lease.



W71 SERIES A TIE SPRAYER. Fast, economical automatic spray coater for protecting newly adzed tie surfaces. Operated by one man in either direction.

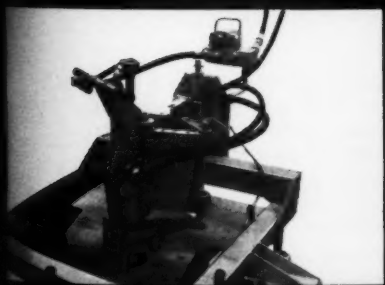


W88 SERIES B TIE BRUSH. One-man operation. Power-driven wire brush is positioned to sweep the tie plate area thoroughly. Self-propelled.



W89 SERIES A CRIB REDUCER. One man can dig crib ballast for a gang of 50 men. Moves back and forth, from crib to crib, hydraulically.

The Fairmont W104
drives tie plugs
uniformly with
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drives tie pla
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IMPROVED FAIR[®] RAIL ANCHOR



. . . a résumé of current events throughout the railroad world

Any threat of a strike resulting from the bitter dispute over work rules between the railroads and the five operating unions has been averted for at least 15 months. The railroads and the brotherhoods have agreed to submit their differences to a Presidential commission. This agreement was negotiated by Secretary of Labor James P. Mitchell, who obtained concessions from both sides. The commission will be comprised of 15 members, with each side nominating five members and the remaining five, representing the public, to be appointed without any consultation with either side. The commission is to begin work between January 1 and 15 and its recommendations are expected by December 1, 1961. This deadline may be extended up to three months by agreement.

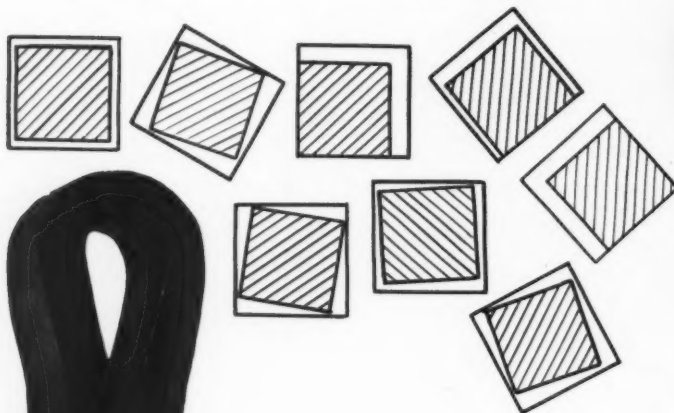
The Erie-Lackawanna merger surmounted another hurdle on October 12 when Judge Thornton of the Federal District Court at Detroit indicated he would not enjoin consummation of the merger, but would issue a temporary restraining order to prevent the consolidated company from changing the status of the employees. The Railway Labor Executives Association had filed suit on behalf of the M/W employees asking the court "to suspend, enjoin and set aside" the ICC's order approving the merger. The RLEA contended that the Commission had violated provisions of the ICC Act when it left the Erie-Lackawanna with the alternative of giving severance pay to employees affected instead of instituting a job freeze. Judge Thornton also indicated that he believed a special three-judge court could be convened by November 15 for an expedited hearing of the case on its merits.

An increase of \$5 million in net income for Class I railroads is estimated by the AAR for August compared with August 1959. The estimate put the August net at \$30 million compared with 1959's \$25 million. For this year's first eight months, however, the estimated net income was off \$86 million from last year—\$277 million compared with \$363 million. Thirty Class I roads failed to earn their fixed charges in this year's first eight months.

Large-scale mergers are the railroad industry's best hope for a prosperous future, James M. Symes, PRR chairman told a convention of southern business leaders. The exact number of systems is not important, he said, but it should be somewhere between 7 and 11 streamlined systems. He visualized two or three such systems in the North, three to six in the West and two in the South.

End of passenger service on the Pennsylvania-Reading Seashore Lines is sought in a petition filed last month with New Jersey's PUC. The road had earlier refused to sign contracts with New Jersey's Division of Railroad Transportation under which the state is seeking to keep "essential" suburban service operating. A 1959 passenger loss of over \$3 million is too big to be overcome by the proposed \$277,000 payment under the state program, the road said.

Troubled with loose fit of spikes in tie plate holes? . . . Plate cutting of ties . . . wave in the rail . . . Irregular gage?



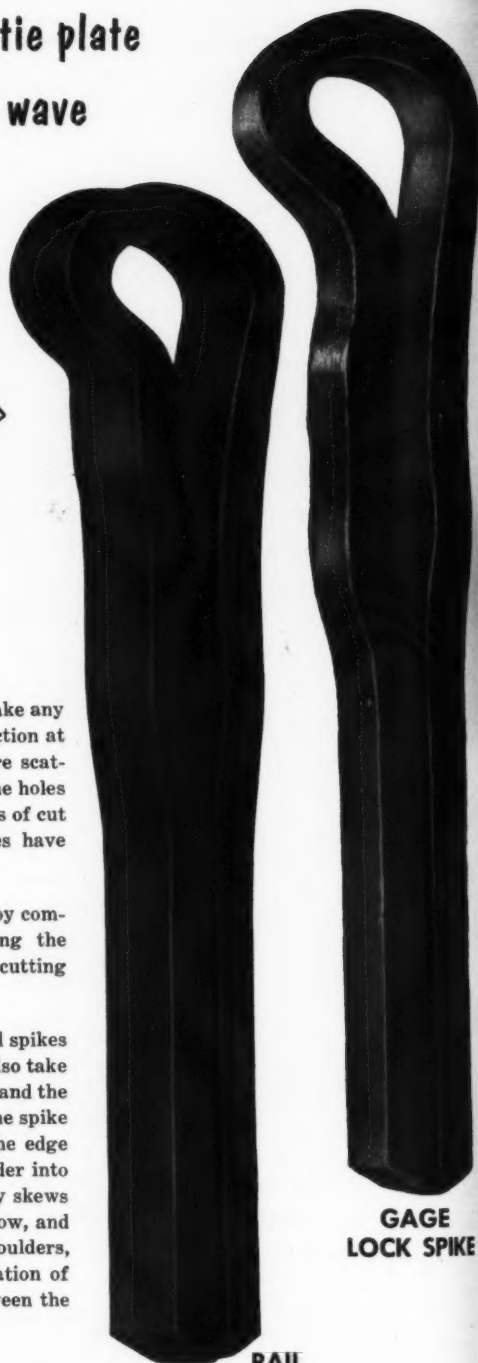
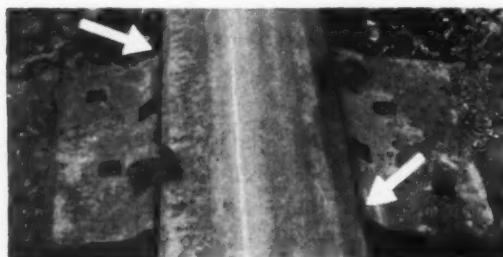
The common $\frac{5}{8}$ " square shank cut spike may take any one of the various positions shown in cross-section at the line spike holes of the tie plate, which are scattered about this page. A reduction in size of the holes will not correct this trouble, as exhaustive tests of cut spikes in the smaller $\frac{11}{16}$ " square lag holes have proved.

Only LOCK SPIKES completely fill the holes by compression of the spread shank—firmly holding the plates to the ties under spring tension. Plate cutting is overcome—Rail is held to gage and line.

Rail Lock Spikes and Gage Lock Spikes are rail spikes as well as plate fastenings. Rail Lock Spikes also take up the play between the width of the rail base and the tie plate shoulders. The slight protrusion on the spike head at the tie plate surface binds against the edge of the rail base and forces the opposite shoulder into contact with the rail base. This action slightly skews the tie plates, as shown in the illustration below, and binds the rail at all four corners of the plate shoulders, as indicated by the arrows. Complete elimination of play in the spike holes of a tie plate and between the shoulders is accomplished.



TIE PLATE
LOCK SPIKE



GAGE
LOCK SPIKE

RAIL
LOCK SPIKE

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420 Lexington Avenue
New York 17, N. Y.



Armco Pipe Piles Help Straighten The Torcer Loop

Eighty miles east of El Paso, Texas, the Southern Pacific recently relocated their main line connecting Los Angeles and New Orleans. In so doing, the railroad eliminated the circuitous Torcer Loop, constructed in 1881. Built on curves from 4 to 10 degrees, this loop was expensive to maintain due to excessive rail wear.

Two large canyons had to be crossed by the new line and Armco Steel Pipe Piles were chosen to support bridges over them. The piles, 16 inches in diameter with $\frac{3}{16}$ -inch side-walls, were driven open end to between 30 and 35 feet penetration. One completed bridge is shown in the photograph.

For details about how Armco Foundation Products can help you, call your nearby Armco office or fill out the coupon and mail it to: Armco Drainage & Metal Products, Inc., 7740 Curtis Street, Middletown, Ohio.

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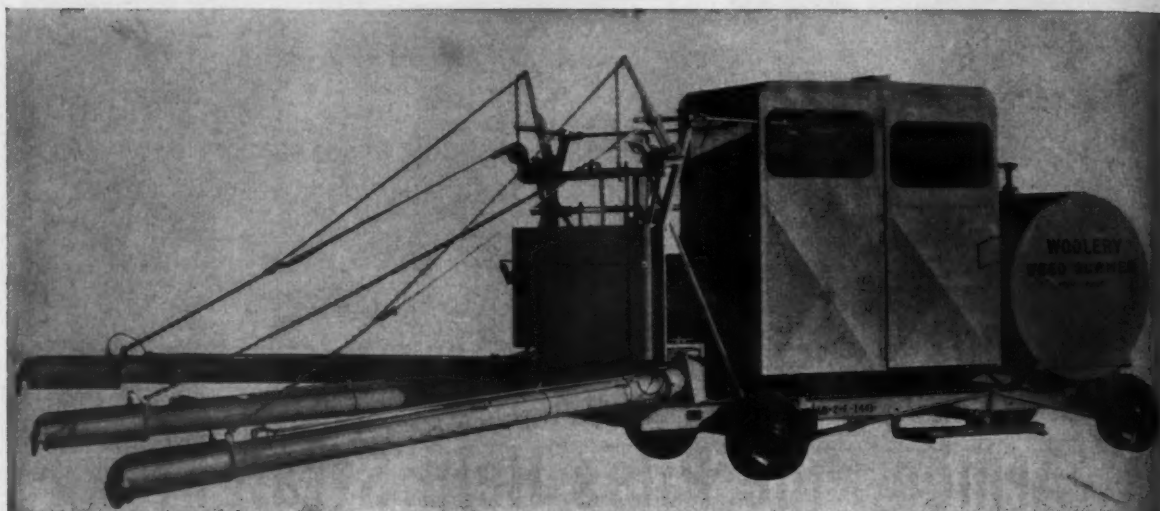
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*Separate Blower engine keeps heat
at constant intensity when
speed is reduced for clearing ice and snow
from yards and switches*

The model WB-2-F (illustrated) has automatic transmission with torque converter; constant blower speed regardless of rate of travel; an all steel cab with safety glass, two entirely separate brake systems and a final drive with chains and sprockets located outside the wheels for easy adjustment. A separate 15-H.P. air-cooled engine is used to drive the blower.

Other Woolery Burners include the Model COE which burns to a width of 25 feet using five burners, the PB-B 3 burner portable and the AB single burner portable.

Woolery also manufactures tie cutters, tie end removers, bolt tighteners, spike drivers, track tool transporters, motor cars and joint rollers. Literature and specifications on request.

WOOLERY MACHINE COMPANY

ESTABLISHED 1917 • 29th & COMO AVE., S.E. • MINNEAPOLIS, MINN.

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OXWELD RAILROAD DEPARTMENT



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It's time right now to think about your bridge protection needs for next year. Too often these projects come as critical emergencies involving unnecessary costs and even traffic interruption.

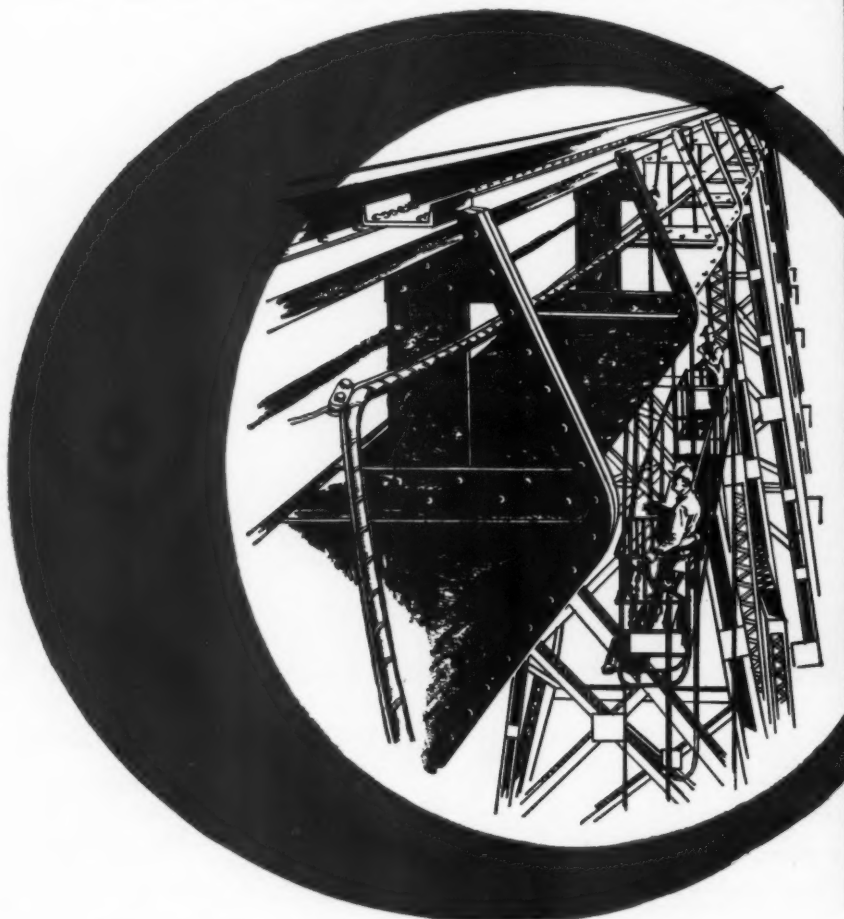
Dearborn's NO-OX-IDs make such jobs physically easy—and easy on your budgeting, too . . . save up to half and more in dollars and time on most bridge coating operations.

They give one-coat, long-lasting mechanical *and chemical* protection . . . contain special bonding and wetting agents . . . require less surface preparation . . . adhere well even over old paint.

A Dearborn engineer will be glad to help set up your 1961 bridge protection program and to give you cost-saving figures.

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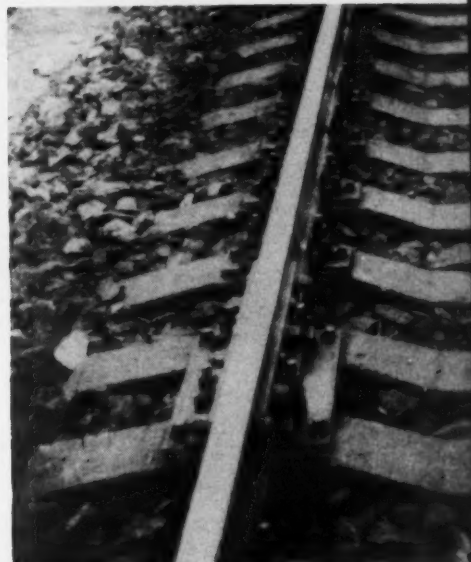
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THIS TRACK is laid with continuous rail and prestressed concrete ties. Note white stones along ballast toe lines.

FASTENINGS used with concrete ties. Rail welds were "not easily discernible by visual observation."



Railroad M/W practices in Russia . . .

... as seen and photographed by an American railroad engineer



HAND-HELD vibratory tampers, used by large surfacing gangs, are modeled after the familiar Jackson tamper, but a Russian is given credit for inventing them.

● Railroads in Russia are "at least some twenty or more years behind our progress." But all employees of the Russian railroads have "that certain desire . . . to become the best transportation organization in the world." And if railroad men in this country get the idea they have reached a railroad "Utopia" and begin to rest on their laurels, "then look out, as in not too many years ahead the Soviet machine will certainly pass us by."

These statements were made by a man who had just spent a month be-

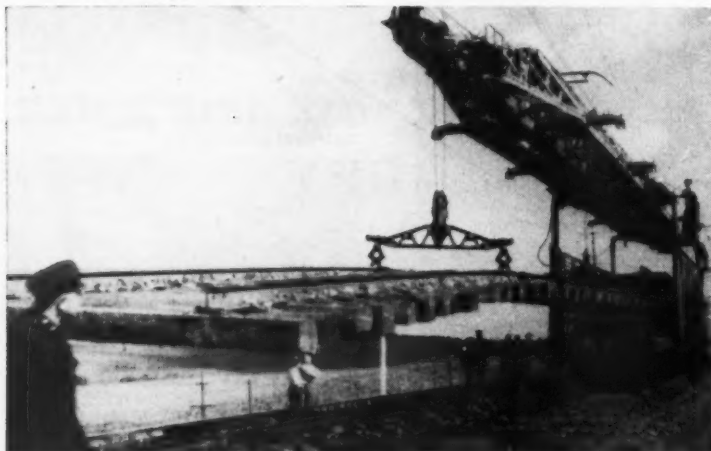
hind the Iron Curtain inspecting the Russian railroad plant. He is Frank R. Woolford, chief engineer of the Western Pacific, and he was speaking before a joint session of the Roadmasters' and Bridge & Building conventions at the Conrad Hilton Hotel at Chicago on September 20.

Mr. Woolford had visited the Soviet Union as a member of an exchange inspection team of American railroad men. The group departed from New York early on the morning of May 26 and arrived in Moscow on May 30.

Between that date and July 1, when it left the country, the inspection team was taken on a 6000-mile conducted tour of Russian railroads. During this time Mr. Woolford had the opportunity of observing and photographing railroad facilities, practices and equipment.

In the course of his travels in Europe Mr. Woolford took more than a thousand photographs. About a hundred of them were shown as slides during his address. A selection of these is reproduced with this article.

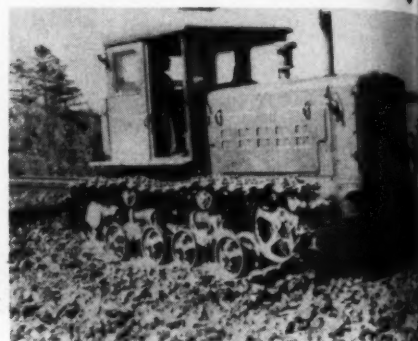
M/W practices in Russia cont'd



TRACK RENEWAL by panel method. This view shows panel of old track being lifted out of ballast and loaded on crane car. These are wood ties.

NEW TRACK PANEL being placed in position as men measure distance from other track. Entire operation required 106 men.

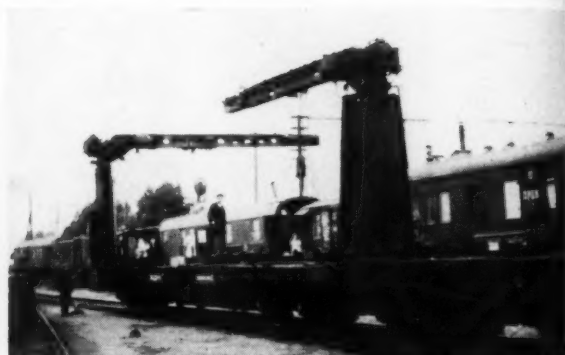
TRACTOR smooths ballast in preparation for laying new panels. Ballast had been cleaned in advance. (See photos lower right, opposite page.)



They renew track by panel method, use vibratory



CONCRETE TIES as positioned and spaced ready for assembly into track panels on assembly-line basis.



CRANES used in handling concrete ties at panel-assembly plant. Location of plant is Reshetnikovo, north of Moscow.



position on
track. In-
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atory

pile driver, undercutting ballast cleaner

mbly plant.



DRIVING rectangular prestressed concrete catenary pole with vibratory pile driver. Pole 20 ft long was driven to within 18 in of ground in about 7 min, according to Mr. Woolford.



CLEANING BALLAST in preparation for renewing track. View above shows dirt being discharged. Photo below shows how machine undercuts track.



BOLTING of plates to rails is first operation in assembling track panels. As here, women are widely used for heavy work.

STRUCTURES

BALLAST CLEANER winches itself forward by cable anchored to track. Note track has been jacked up ahead of cleaner. ►

For more than a year the Pennsylvania has had a Matisa ballast cleaner at work undercutting the track and cleaning the ballast at various locations on the system. Mainly, the machine has been working at locations where repeated raising of the tracks has created problems at overhead and railroad bridges. The method is not only more economical than raising the bridges, says the road, but it improves drainage and provides material for building up the shoulders.



How PRR saves by undercutting

● Through the use of equipment that undercuts the track and cleans the ballast at the same time the Pennsylvania has tackled a series of problems that has been in the making for many years. And experience is that the equipment is not only solving the problems but is doing it in an economical manner.

The problems referred to have come about as a result of repeated out-of-face raising of the track. The result is many locations where clearances have been reduced at overhead bridges. At many other locations, approaches to railroad bridges have been raised to the point where they cannot be raised further without raising the bridges.

A related problem is produced when repeated raising of the track causes the ballast section to "outgrow" the embankment. "We have hundreds of miles of railroad where we're going to have to raise the embankment if we keep on raising track," says C. J. Henry, the PRR's chief engineer.

The railroad was thus faced with two alternatives: It could either raise bridges and embankments as necessary to adjust to the track conditions, or it could lower the tracks at the troublesome locations.

The latter alternative would obvi-

ously be preferable if means could be found for undercutting the track economically. Officers of the road felt that what was needed was a means of undercutting that would keep abreast of a heavy maintenance gang for doing follow-up raising and surfacing. This meant that the rate of progress would have to be about a half mile a day.

In the late 'Forties the PRR had had experience with the Matisa ballast cleaner which undercuts the track as part of the cleaning operation. This machine has an endless digging and conveyor chain that is threaded underneath the track to excavate the ballast and carry it by conveyor belts for delivery to vibrating screens. The cleaned ballast is returned to the track immediately behind the machine and the dirt removed from it is discharged to the right of way by a conveyor mounted on a swivel-type boom. The machine makes a minimum cut of 11 in. It is moved forward when cleaning ballast by a winch mounted on the machine, which reels in a cable anchored to the track ahead of the unit.

Using one of these ballast cleaners on a contract basis, the railroad figured it could undercut the track and clean the ballast at a cost of about \$1,000 per mile. Since this is the approximate

cost of the new ballast that would be required if the track were raised, it was reasoned that the saving in ballast would pay for the cost of using the machine.

On this basis the road concluded that in the majority of instances it would be more economical to cut down the approaches to a bridge for about a half mile each way than to raise the bridge. Actually, according to the railroad's engineering officers, there have been occasions when it has been necessary to spend well in excess of \$20,000 to raise a bridge. Where the structure involved is a stone arch, the cost of raising the ballast retaining walls to permit the track to be raised across the structure may run as high as \$50,000 or even more.

In view of these considerations the PRR started last year to use a Matisa ballast cleaner for lowering the track grade at various locations, and has continued to use it this year. Generally speaking the aim is to lower the track 2 in to 3 in. This is achieved by jacking up the track 5 in or 6 in ahead of the ballast cleaner, blocking it in that position, undercutting to a depth of 11 in with the ballast cleaner, then giving the track a 3-in raise on the cleaned ballast. The amount the track is lowered can be varied by changing



THE RAILROAD figures that the savings from cleaning and re-using the ballast pay for use of machine.



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STRUCTURES

the amount the track is jacked up, or the final raise, or both.

The practice generally is to coordinate the undercutting operation with tie-renewal and out-of-face surfacing work. Since all of the undercutting work is being done in multiple-track territory the practice is to obtain the use of the track for this work for periods ranging from 4½ to 6 hr. Progress has averaged about 2000 ft per day.

Manpower used in the undercutting and cleaning operation includes two men furnished by the contractor, one operating the ballast cleaner and the other operating the winch. In addition to the foreman, railroad personnel at the ballast cleaner consists of two laborers, one guiding the ballast-return chute to obtain proper distribution of the material across the track, and the other manipulating the dirt conveyor.

The cutting down of the approaches to Bridge 151/48 affords an example of the use of the ballast cleaner for this type of work. This bridge is located on the Pittsburgh-Chicago main line in double-track territory west of Wooster, Ohio. The problem here was due to the fact that the eastbound track had been raised to the point where it had become necessary either to cut down the approaches or raise the bridge,

which is a multiple-span through-truss structure. Since economics were on the side of undercutting this procedure was decided on.

The undercutting operation was started about a half mile from one end of the bridge and carried up to that end of the structure. The equipment was then moved across the bridge and the work resumed, being carried the same distance beyond the structure. No tie renewals were made.

Lead unit in this undercutting operation was a Nordberg Power Jack which raised the track just enough to "crack" the ties. The ballast cleaner then undercut the track 11 in, after which a raise of 5 in was made on the cleaned ballast. The result was that the track was lowered about 6 in.

The raise of 5 in was made in two stages. After the final raise the track was allowed to settle under traffic. It was then surfaced twice more to assure the desired compaction of the ballast under the ties.

An example of the use of the equipment for lowering tracks under overhead bridges is afforded by a project carried out at Cleveland, Ohio. Here Kinsman street, a four-lane thoroughfare, is carried across thirteen yard tracks of the PRR's Kinsman Street yard and two main tracks on a multi-

ple-span through-truss bridge. A need for increased clearance under the bridge came about as the result of the introduction of new types of rolling stock.

To get the increased clearance, it was decided to lower the tracks a maximum of 18 in, using the Matisa machine. Since the ballast in the yard tracks consisted of fouled engine cinders, this material was removed by the undercutter and loaded directly into gondolas for disposal. The main tracks had crushed stone ballast, so this material was cleaned and returned to the track.

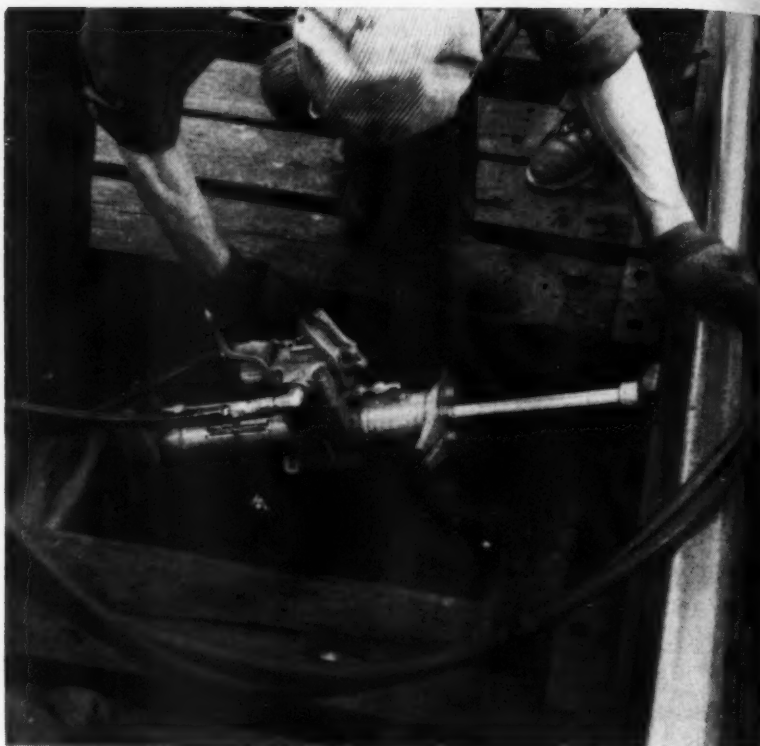
To get the required 18-in reduction in grade, the tracks were undercut a total of 24 in with a maximum of three passes being made and then raised 6 in on slag ballast. Ties were renewed in connection with the work. The railroad figures that substantial savings were effected compared with the cost of raising the bridge.

PRR engineers point out that the practice of undercutting the track has other advantages besides solving problems created by repeated track raisings. For one thing, they say, it results in better drainage of the track section. For another, they add, it provides material for building up the track shoulders.



1 Drift bolts are pulled from one chord by hydraulic bolt puller to permit shifting. Ties have already been spread by deck liner and deck stripped of guard rails.

2 Chord is shifted outward to permit driving the No. 3 piles. Head of hydraulic ram of deck liner bears against the running rail in this operation.



Hydraulic tool speeds pile driving

● Pile-driving work on the Great Northern in connection with programmed trestle-redriving operations is being carried out at a much faster clip these days than in the past. Formerly, the driving of 20 piles in a bridge carrying main-line traffic was considered a good day's work. Now a crew will drive an average of 33 piles a day, according to officers of the road. They point out that this increased production, achieved with a smaller num-

By adapting the Fairmont deck liner to a new use—shifting

ber of men, means that substantial economies are being realized.

Key to the greater production is the adaptation of a hydraulic tool to a task for which it was not originally visualized. The tool is a hydraulic deck-liner which forms part of an assembly of hydraulic tools developed by Fairmont Railway Motors especially for use in making repairs to timber trestles. Early this year the GN obtained one of the deck-liners, along with several other tools comprising the outfit and a hydraulic power plant developed for use with them. The other tools acquired consist of a bolt puller, an impact wrench and a bolt cutter.

The deck-liner was obtained primarily for lining the decks of open-deck bridges and for holding brace planks snugly against the piles while they are being bolted. Experiments with the tool indicated to the road that it could be used for shifting the timber stringer chords of trestles when driving piles. It was observed, further, that use of the deck-liner made it possible to perform this work faster than was formerly possible. By adopting

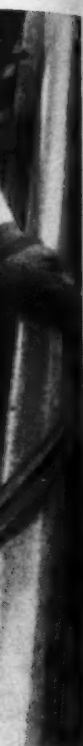
the device for this purpose, GN officers say they are securing greater utilization of a pile-driving outfit, as well as minimizing the cost of work-train crews.

Piles driven out of face

It is the practice of the GN to schedule its pile-driving work so that the outfit and operator can work progressively in an out-of-face procedure over the railroad. This work is carried out independently of other bridge work, such as the installation of new caps, the application of cross and sway bracing, and deck work, which is done later.

For driving piles on its Lines East, the GN uses a Syntron K-12 diesel hammer with an American 40-ton crane, converted for use as a pile driver. Other hydraulic tool units accompanying the pile-driver outfit include the impact wrench and the bolt puller.

When redriving a trestle, it was the road's former practice to drive all piles for one bent before starting on the adjacent one. The procedure was to shift



3 After all the No. 3 piles have been driven on the bridge the deck liner is moved to the top of the cap for pushing the chord over to enable the No. 2 piles to be driven.



4 Hydraulic power unit is carried on push car with other hydraulic tools. At this point the pile driver is driving No. 1 piles. Piles 4, 5 and 6 will then be driven.



shifting

stringer chords—GN gets maximum pile-driving output with reduced work-train expense

GN offi-
greater
outfit, as
of work-

the bridge ties and stringer chords to permit the driving of the No. 3 and No. 4 plumb piles (of a six-pile bent), shift the chords again to drive piles No. 2 and 5, then shift the chords back to their original positions and drive piles No. 1 and 6. The chord shifting was done by using two track jacks.

How work is now done

Present practice is first to drive the No. 3 piles of all bents of a bridge. This is followed by driving all the No. 2 piles, then the No. 1's, 4's, 5's and 6's in that order. A day in advance of the driving, three men strip the bridge deck, removing the outer timber guard rails and the inner T-rail guards. The impact wrench is used for removing and setting the lag screws in the outer timber guard rails and the bolt puller is used for pulling drift bolts from the stringers as well as the boat spikes from the guard rails and ties. The crew also spreads the bridge ties, using the deck-liner unit, at the points where the new bents are to be driven. It also pulls the drift bolts, using the bolt

puller, from the stringers of one chord leaving only an occasional bolt to hold the chord in line.

Meanwhile, three other men erect staging beneath the deck at a level convenient for making pile cut-offs. Details of this staging are given on the following page.

The pile-driving work begins the following day. The remaining drift bolts of four-ply chord No. 1 are removed and the deck-liner is placed between the two chords and used to jack chord No. 1 outward. Working in back-up position, the pile driver then drives the No. 3 piles for all new bents. A three-man crew follows behind and jacks chord No. 1 toward the center of the cap and close to chord No. 2. This is done by placing the deck liner on the cap with the ram end of the device pushing against a chain secured beneath the cap to one of the old piles.

After completing the driving of all No. 3 piles of the bridge, the pile driver proceeds to drive the No. 2 piles for all new bents. While these are being driven, the deck-liner unit is lifted to the deck and is used to push chord No. 1 back to its normal loca-

tion. This is done by placing the ram end of the hydraulic tool against the base of the opposite running rail and jacking the chord away from center. The chord is then drift-bolted in place. The No. 1 piles are then driven.

In a similar manner the deck-liner is used to shift chord No. 2 when driving piles No. 4, 5 and 6.

When driving piles, the road now uses a bridge crew comprised of a foreman and nine men. Before starting to use the hydraulic bridge tools, six or eight additional men were required for stripping and opening up the deck, using hand tools and jacks, or else the pile driver would be standing idle, incurring unproductive expense for both the machine and the train.

While the power unit and deck-liner are being used by the pile-driving crew, the road found that the other hydraulic tools were needed by another bridge gang. To provide the power necessary, the Great Northern assigned a truck equipped with a hydraulic boom to the crew and utilized the power pump of that machine to power the tools.

STRUCTURES

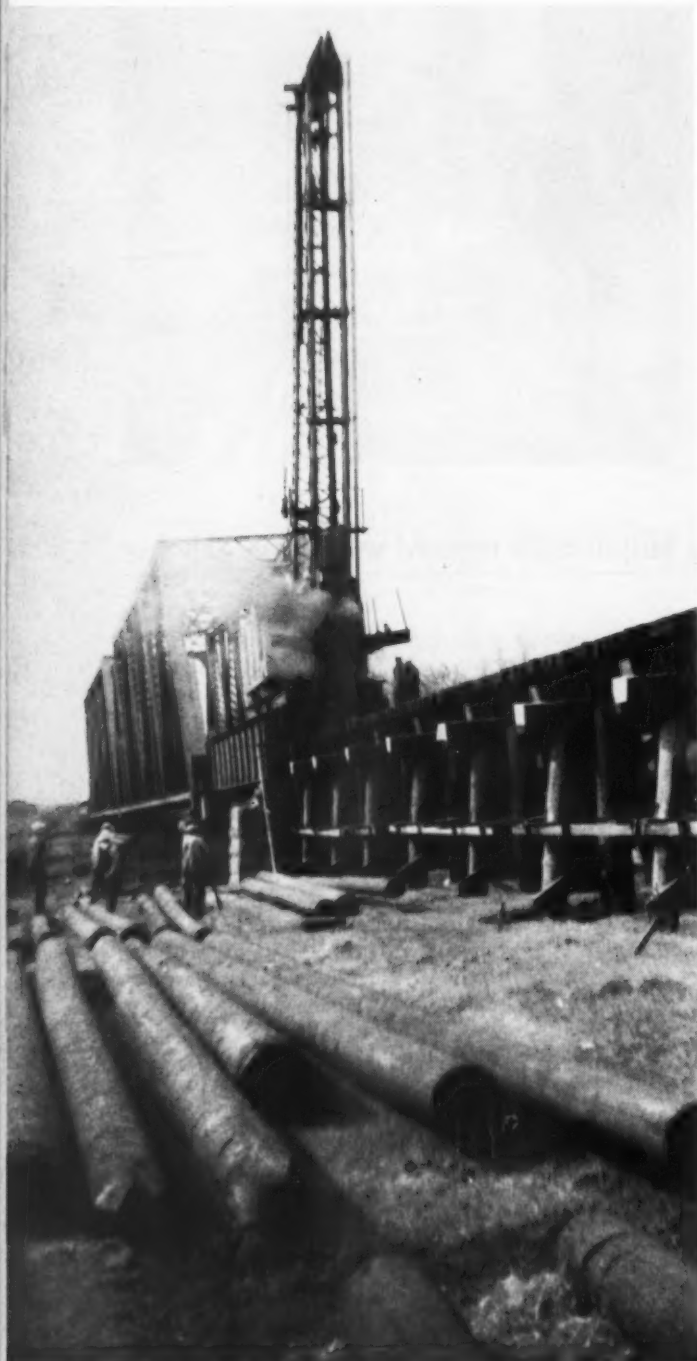
RAILWAY TRACK and STRUCTURES

Two more time-saving ideas



Speeds pile driving cont'd

Other GN pile-driving time savers



STAGING, hung from special steel brackets, is provided at a convenient height for men when making pile cut-offs.

The Great Northern has taken a hard look at some of its other pile-driving practices with the view of improving and speeding up that work. Out of these observations and studies, it has developed some simple devices which facilitate the work. Two of the most noteworthy are a special car stake that facilitates the unloading of piles from cars and a steel bracket for the speedy erection of staging.

Special car stake

The car stake is used when unloading piles 40-ft long and shorter. The longer and heavier piles are unloaded by a crane. The stake is of steel and is hinged at the lower end. Two of them replace the end wood stakes on one side of a loaded car. They are held upright by a rope and length of chain slung over the load and hooked into stake pockets on the opposite side of the car.

In preparation for unloading a car of piles, long-handled saws are used to cut the intermediate wood stakes on the side having the steel stakes. The men doing the sawing work safely from the ground at the end of the car and beyond the ends of the loaded piles. Also, the lower tie wires used in the tiers of piles are cut.

At this point, the piles are being held under load by the wood stakes on one side of the car and by the steel end stakes on the other side. Men at each end of the car then cut the ropes of the steel stakes, and the load spills out on the ground, rolling down the special steel stakes without damage. Any piles remaining on the car are unloaded by men using peavies. The piles are then sharpened by making cuts on four sides with chain saws.

Staging hangers

The brackets used for the staging are steel hangers for providing a more stable working surface than the former hanging platforms held by rope slings, which had a tendency to sway under foot. The steel hangers are applied to the field sides of the outer batter piles and are hung on bolts screwed into the piles at a level convenient for men making pile cut-offs.

The hanger is L-shaped in design. The hanger upright has a hole large enough for it to be slipped over the head of the bolt in the pile. Above this hole is a vertical slot which is slightly wider than the shank diameter of the bolt by which the hanger is supported. This provides a secure fastening without any possibility for the hanger to slip off the bolt. The projecting base of the hanger is formed so as to provide two rectangular openings into which 4-in by 6-in timbers can be thrust.

After the hangers have been applied to all bents, timbers, long enough to span the distances between bents, are threaded through the hanger openings. One end of a timber is placed through the outer opening of the hanger and the other end through the inner opening. This provides a continuous support for the entire length of the bridge. Planks are then laid transversely between the supports to give a stable working surface wherever needed between bents.

When new bents have been driven, new bolts are applied to the outer piles so as to be available for the erection of staging throughout the life of the bents. The hangers are removed at the completion of the work at hand.

Besides being safer than the rope slings, the road reports that its new staging is more easily erected.

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DIESEL CRANE places racks alongside track to be taken up. For movement to site the racks are coupled by joining rail ends.

● Since the New York Central started taking up track in panels (RT&S, March, 1960, p. 47) it has made marked improvements in the methods and equipment used in this work. Result: In taking up a single-track line, a team of nine men and three machines is now capable of lifting and loading 60 panels a day.

Key units in the new system are racks for receiving the panels as they are taken up. Each rack consists of a freight-car truck on which is bolted two rails. In preparation for taking up a section of single track the joints are disconnected and the rails are shifted longitudinally to square the joints. A number of the racks is distributed alongside the track at intervals of six panel lengths. A diesel locomotive crane is used to set them off.

As the work of taking up the track progresses, starting at the outer end and working backward, a crawler crane sets the empty racks on the rails and then takes up and loads the panels on them. After each panel is loaded a rubber-tired tractor pulls the rack into position to receive the next panel. This procedure continues until a string of six racks has been loaded, each with six panels. The diesel crane then hauls the string of loaded racks to a yard location where the same crane loads the panels into gondola cars for shipment.

The nine-man crew used in the operation consists of a three-man lifting gang, a three-man loading gang, and operators for the two cranes and the tractor.

The new system was used in taking up about nine miles of track on the abandoned Auburn branch in New York. These panels were used in the construction of mining spurs.

Special racks speed track removal in panels



TRACK is removed by crawler crane which returns racks to track one by one and then takes up track panels and loads them on the racks. When six racks have been loaded the diesel crane will haul them to point where they are loaded in gondolas for shipment.

TRACTOR pulls rack forward as panels are loaded on it. Rack on ground will be next to be lifted on track to receive the panels.



SHIFTING panels from racks to gondola cars for shipment to point of use. These panels were to be used in constructing mining spurs.



Recent years have seen numerous new developments in paints, with the result that the paint user is confronted with many strange terms. Ester gums, maleic coatings, alkyds, phenolic resins, epoxies, silicons, latex paints—these are some of them. This article, based on an address presented before a meeting of painting and decorating contractors, explains the new developments in non-technical terms.

By R. E. Gwyther

Technical Manager, Industrial Maintenance Development
The Sherwin-Williams Company

Resins and their characteristics

Linseed-oil paints:	Durable in normal weather.
Ester-gum varnishes:	Faster drying and earlier hardness, inexpensive, better than linseed-oil paints for interiors but not for exteriors.
Maleic coatings:	About the same as ester-gum varnish.
Phenolic resins:	Hard, tough film with some chemical and water resistance but discolors with age.
Alkyds:	Fast drying, durable on exterior exposures. Has good color retention for wood and metal surfaces but is inferior to phenolics in hardness, abrasion and chemical resistance. Not used on masonry except over an alkali-resisting sealer.
Coumarine-indene:	Melts at comparatively low temperatures, discolors on exposure to sunlight. Has good alkali resistance. Used principally in aluminum paints.
Catalyzed epoxies:	This is a two-package material which must be applied immediately after mixing. Produces a hard heavy film. Resistant to chemicals, including strong acids and alkalis, and to strong solvents. Fine for concrete floors and walls.
Epoxy esters:	Not as hard as catalyzed epoxy but has good intermediate grade of chemical resistance. Is fast drying, easy to apply and produces a hard, tough film. Except for chalking, it has good exterior durability.
Silicone coatings:	Have good resistance to heat. Hence silicone aluminum coatings are used on high-temperature surfaces. Used in dilute solutions to waterproof concrete, leather, paper, etc. Highly water resistant. Not used for exterior surfaces unless cured by heat.
Synthetic rubber:	Dries so rapidly it is hard to brush. Is resistant to acids and alkalis and successful as concrete coating. For exteriors it is used as undercoaters for concrete surfaces.
Chlorinated rubber:	Has outstanding chemical resistance and high resistance to water, acids and alkalis. Is durable on exterior exposures. Good for swimming pools, water-treating plants.
Latex paints:	Are low in cost, easy to apply and clean up, fast drying and have a low fire hazard, low odor and good alkali resistance. Used for both interiors and exteriors, but exterior wood surfaces and chalky painted surfaces should be primed first with an oil primer.

RESINS . . .

● The very earliest paints of which we have knowledge were the colored clays the cave men used in drawing pictures on the walls of his cave. Naturally, these had little resistance to the elements and, except for some lucky accidents, we probably would have no record of them.

In historic times, men launched a search for a means of improving the durability of paints. It was recognized early that a binder or vehicle of some kind would have to be incorporated with the earth pigments to achieve this aim. The Egyptians used natural pitches and resins for this purpose, and their successors employed waxes, animal fats, whites of eggs and even skimmed milk.

The search eventually led to linseed oil and references to this familiar oil extracted from flax seed date back to the eighth or ninth century.

Now I will stop the recitation of history at this point because I think linseed oil—the friend of paint makers for centuries—gives us a good point of reference for a detailed discussion of our subject.

All of us know and use linseed oil, but I wonder if we have ever stopped to think how interesting linseed oil is.

Linseed oil paints

Let me explain its qualities this way: The first requirement for any paint is that it must be a liquid material which can be spread on a surface and will later become dry and hard. Linseed oil fits this description exactly. It is a liquid and, when spread in a thin film, it will harden.

What makes it dry and harden? Nothing more nor less than the oxygen in the air which combines with the oil in a process known as oxidation. This is a highly significant characteristic of linseed oil for it means that it will produce a hard film anywhere there is air to interact with it.

You will find, as we go further into this discussion, that this unusual drying ability of linseed oil is not limited to application in simple oil paints, but is broadly used to supplement drying properties of many other resins.

Linseed oil is not the only drying oil that is used in making paint. There are several others which are used in large quantities. Soybean oil, derived

What they are; how they're used in paints

from the soya bean, is one. China-wood oil, also known as tung oil, is another. Castor oil is still a third. In addition to these and other vegetable oils, fish oil derived from salt-water fish, such as menhaden and sardine, is also widely used.

For the purpose of this discussion, I shall confine my references to linseed oil simply because it is the oil which is most familiar. But do not overlook the fact that the other oils I have just mentioned share in some degree the characteristics of linseed oil—acting as a binder in the paint film and contributing to the drying of the film.

Natural resins

The earliest modifications of linseed oil were made with natural resins such as amber or balsam.

Typical of such resins is the natural gum that comes from the pine tree. We know it as "rosin." It is a hard, brittle material that certainly cannot be spread on a surface. How, then, can we use it in paint? The answer is that it can be dissolved.

To dissolve resin, we use petroleum solvents such as mineral spirits or turpentine, or even gasoline. Once it is dissolved, we have a liquid solution which can be spread on a surface. After the solvent evaporates, the rosin returns to its original hard, brittle state.

You recognize at once that we have here a new mechanism of drying, namely, drying by evaporation. This occurs much more rapidly than the oxidation process which dries linseed oil.

Some products, such as lacquer, shellac and spirit varnish, dry only by evaporation. Others dry only by oxidation. Still others dry through a combination of the two processes. You will find as we go along that the various mechanisms of drying are quite important and have a great bearing on the usefulness of the various resins.

Ester gum

A resin solution, once it has dried, does not leave a very satisfactory film. It is hard but brittle, and crushes easily. It also softens when heat is applied. Furthermore, it is acid in nature, a characteristic which affects many pigments adversely and which

also interferes markedly with the stability of the paint in the can.

Hence, a natural resin solution is of little use by itself, but it can be processed with linseed oil to produce a varnish which has useful properties.

The first step is to neutralize the acid nature of the rosin with glycerine. This step produces ester gum. The ester gum is then cooked with oil to make an ester-gum varnish. The resulting varnish is a simple solution of ester gum in oil and solvent.

The properties of this ester-gum varnish are essentially the average properties of the oil and gum. The varnish dries both by evaporation of the solvent and by oxidation of the linseed oil. Partial drying occurs quickly by evaporation. After a longer period, the film hardens by oxidation. The film has earlier hardness because of the ester gum, and retains some of the toughness of the linseed oil.

Compared with an oil paint, ester-gum varnish has the advantages of faster drying and earlier hardness. The cost is reduced, particularly on a gallon basis because part of the gallon is now thinner. For many interior uses, the product is more satisfactory than linseed oil because of the faster drying and earlier hardness. However, for exterior use, it is not as durable as oil paint. In general, we can classify ester-gum coatings as inexpensive materials which do a serviceable job where the use of more expensive coatings is not warranted.

Maleic coatings

Maleic coatings are first cousins to ester-gum coatings. Maleic anhydride is used as an improved means to put rosin and linseed oil together. In an ester-gum varnish, the resin and the oil are simply dissolved together by heating. Maleic anhydride improves this blending by tying the rosin and the oil together chemically. This increases the hardness and raises the melting point.

We have in maleic coatings what we call a polymer, which is simply several small molecules tied together to produce a larger molecule. This large molecule is nearly solid to start with. It dries quickly by evaporation and requires less oxidation to become hard.

Maleic coatings are slightly faster drying and somewhat more durable than ester-gum coatings. However, they are not greatly better and must be considered generally in the same family as ester-gum coatings and to have the same general properties.

Phenolics

The phenolic resins were our first true synthetic resins. The first use for these resins was in making molded plastic objects, such as ash trays, fountain-pen barrels, etc. Phenolic resins are hard, and the hardness is achieved by baking at a high temperature.

In pure form these resins are used to produce high-temperature baked coatings, such as linings in food cans. However, to use them in architectural air-dry coatings, we must find other means to make them dry.

How do we do this? We rely on our old friend, linseed oil. The phenolic resin is cooked with linseed oil to produce a varnish.

Again the properties of both ingredients carry through. The oil contributes the air-drying ability and flexibility and toughness of film. The phenolic adds considerable hardness to the film and also greatly improves the water and chemical resistance of the film.

Possibly the greatest weakness of phenolics is that they discolor on exposure or with age. In fact, they are yellow to start with. For architectural use, then, the principal application is

(Continued on page 36)



ORGANIZED MECHANIZATION

CUTS COSTS OF SURFACING OPERATIONS

... Here are the advantages
of using coordinated Nordberg
machinery in out-of-face
surfacing and Smoothin'

ORGANIZED MECHANIZATION has two vital parts. First, providing the best combination of equipment to do a given job, and second, coordinating that equipment into an efficient working team.

The advantages of Organized Mechanization, utilizing Nordberg Mechanical Muscles include (1) Single source of responsibility for all machines; (2) Each machine is designed and built to work most efficiently with other Nordberg machines; (3) Maximum parts interchangeability between machines; and (4) Training of operators is easier and abilities are readily transferred to operate all machines built and backed by Nordberg.

Illustrated here are five Nordberg machines working together smoothly as a team to do out-of-face surfacing and *Smoothin'* in the best possible way and at lowest cost.

In out-of-face surfacing, the self propelled *Tamping Power Jack*, main unit of the *Trak-Surfacers* team, raises track, tamps ties to hold the raise, and provides propulsion power for itself and the *Trak-Surfacers*. In this operation, the *Trak-Surfacers* uses a stretched wire 125 feet long to form a reference line for the top of the grade rail. Following right after, the improved *Gang Tamper* tamps all ties. Then the *Trakliner* and *Line Indicator* come into play to line tangent and curve track.

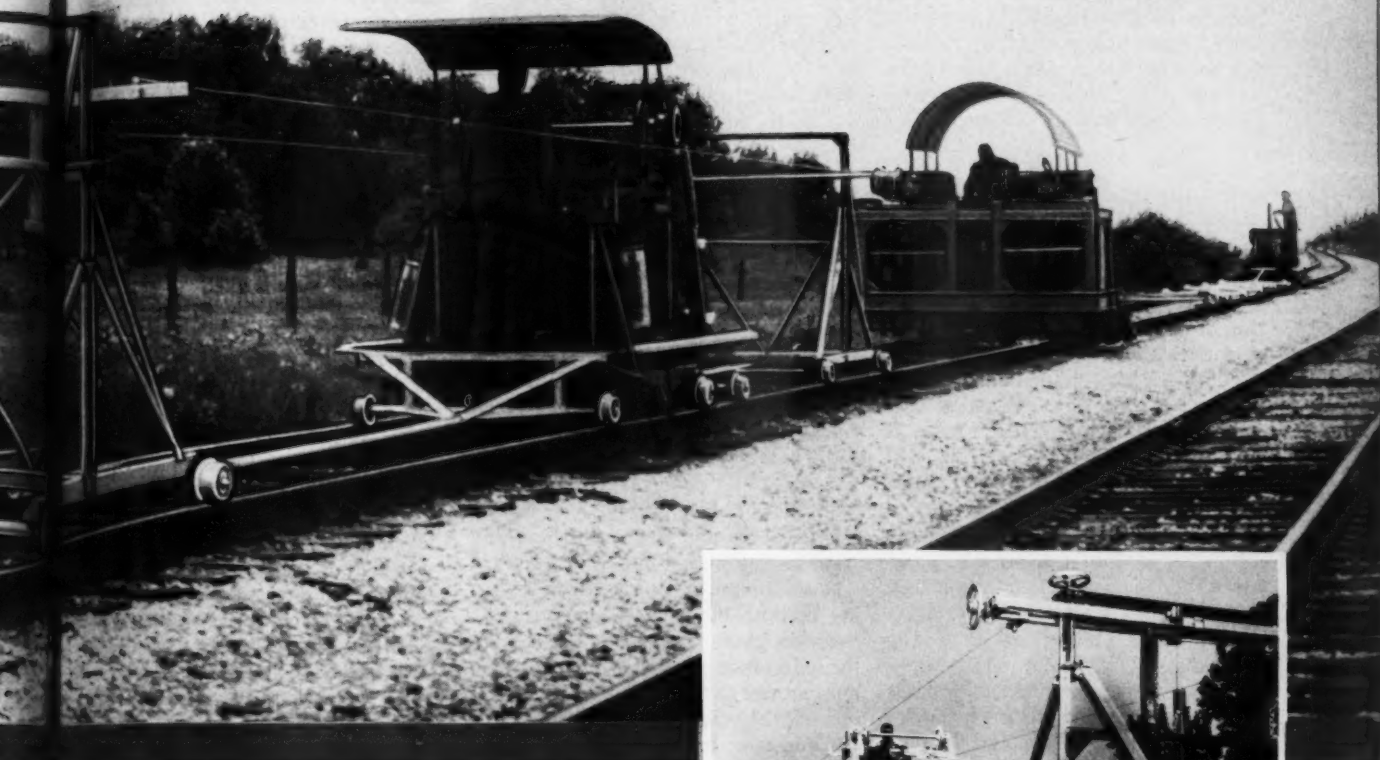
In *Smoothin'* operations, the same basic Nordberg machines are used, except that the *Trak-Surfacers* uses a shortened wire 50 feet long.

Save money and speed up all your track maintenance operations with
ORGANIZED MECHANIZATION.

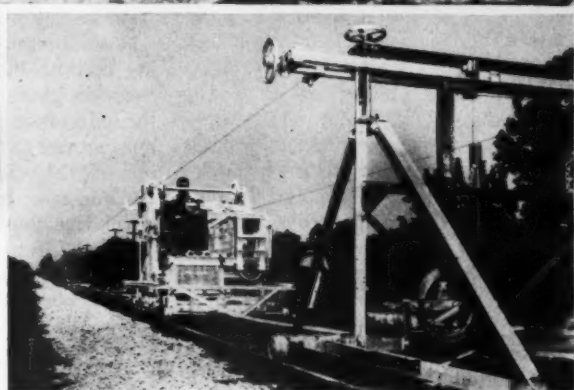


The Tamping Power Jack has new double vibrator which increases vertical vibration and stabilizes cross-level bubble and pointers.

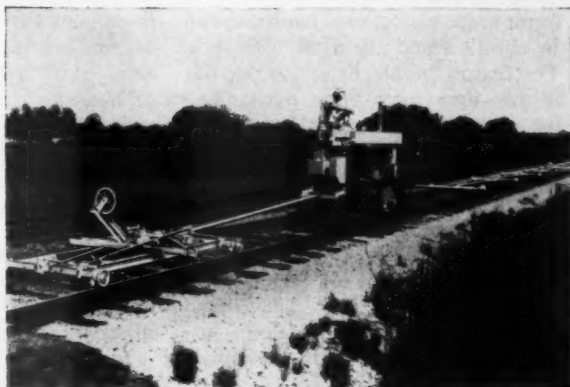




Above: Over-all view of a Smoothin' operation, showing the Nordberg Trak-Surfer—Tamping Power Jack team with shortened wire, Gang Tamer, Line Indicator and Trakliner. **Right:** Tamping Power Jack—Trak-Surfer team with 125' wire in out-of-face surfacing operation.



The improved Nordberg Gang Tamer tamps by impact and vibration. Tamping effectiveness is improved and tamping speed is increased.



With the Trakliner as the central unit, the Nordberg Line Indicator does a complete job of sighting and lining track. Sighting is done with a 120 ft. wire.



NORDBERG
Mechanical Muscles®



Resins in paints *(Continued from page 33)*

in floor paints and varnishes. Resistance to abrasion and to chemicals used for cleaning makes them suitable for this use. They are also used for exterior spar varnishes and for chemical-plant maintenance varnishes.

Alkyds

An alkyd is the result of reacting an alcohol with an acid. Hence, the name alkyd is derived from the first portion of the word "alcohol" and the last portion of the word "acid."

A pure alkyd resin can be made by cooking together phthalic anhydride (which is a white powder) and glycerine (a colorless liquid). The result is a hard, light-colored resin. This resin is very difficult to dissolve and for this reason is not practical raw material to use in paints. Again, we need some means to put this resin to work, and again we rely on our old friend linseed oil.

In practice, the pure alkyd resin is never made. This operation is simply by-passed. The oil-modified resin is made directly in one process by cooking the oil, the glycerine, and the phthalic anhydride to produce a complex, chemically reacted polymer.

Again, the properties are average. Drying results from evaporation drying of the resin, and from oxidation of linseed oil.

Oil-modified alkyds are used in greater volume today than any other synthetic paint vehicle. They are inferior to the phenolics in hardness, and in abrasion and chemical resistance. The reason the alkyds are so popular is that they have three outstanding properties: They are fast drying; they are very durable on exterior exposure; and they have good color and color retention.

Alkyds are used for making fast-drying enamels for both interior and exterior application, for architectural and industrial use alike. They make excellent interior wall and trim finishes, and excellent exterior enamels for wood and metal surfaces. They should not be used on masonry or other alkaline surfaces, except over an alkali-resisting sealer.

Coumarine-indene resins

Coumarine and indene are chemicals obtained by fractional distillation of coal tar. These resins are available

in different grades of hardness. They are soluble in petroleum and coal-tar solvents. The resins dry by evaporation, but can be blended or cooked with linseed oil to produce varnishes which dry by evaporation and oxidation.

Like all resins, coumarine-indene resins have advantages and disadvantages. They melt at comparatively low temperatures and are, therefore, not suitable where heat resistance is required. They are not particularly good for exterior exposure in light colors because of their tendency to discolor, especially on exposure to sunlight.

Coumarine-indene resins are neutral and non-reactive. They have good alkali resistance. Because they are neutral, they are well suited for use in aluminum paints, producing stable one-package aluminum paints with good leafing properties. These resins and aluminum are mutually supporting because the neutral character of the resin insures package stability, and the reflectance properties of the aluminum protect the film from sunlight and obscure the yellowing that does occur.

Coumarine-indene resins are used in rubber compounding, linoleum and floor tile. In paint, their use is principally in aluminum paints.

Epoxy resins

Epoxy resins are relatively new in the paint industry, having appeared commercially since World War II. It is difficult to tell you what they are except through chemical terms. The name epoxy is derived from the chemical name for a portion of the molecular structure. Suffice it to say that epoxy resins are a family of resins which are distant relatives of the phenolics.

Epoxy resins may be used in several different ways. They can be reacted with other chemicals and resins by baking, to produce castings or films with outstanding chemical and mechanical-resistance qualities.

In the field of air-drying coatings these resins produce films of very unusual character and by a completely different form of drying. In use, epoxy coatings are mixed with other chemicals or resins and the two components react together chemically to produce a hard film. Since no air is required, these coatings will dry in heavy films. These are commonly called catalyzed-epoxy coatings. The films produced

are as hard as most baked enamels. They are very resistant to chemicals, including strong acids and alkalis, and to strong solvents.

The mechanism of drying involves a problem new to the painting trade. These are two-package materials formulated with the proper kinds and amounts of materials in each package so that, when mixed, hardening will occur. As soon as they are mixed they must be applied, and quantities left over must be thrown away or they will become solid in the package. Brushes must be cleaned before this hardening occurs. The limited time of workability is referred to as "spot life" and may vary from a few minutes to a day or more.

The so-called "catalyzed-epoxy" coatings have excellent solvent and chemical resistance and have found use in chemical-plant maintenance. They are also excellent coatings for concrete floors and walls, producing a coating which is very resistant to traffic, abrasion, chemicals and cleaning.

I am sure you will not be surprised when I tell you that even the epoxy resins can be modified with linseed oil to produce a coating which will dry by oxidation. Such products are called "epoxy esters." Although not as hard nor chemically resisting as the catalyzed type, the epoxy esters have a good intermediate grade of chemical resistance. They are fast drying, easy to apply and produce hard tough films. The esters do not require the use of a catalyst.

All of the epoxy coatings chalk rather freely on exterior exposure. Other than this, they have good exterior durability.

Silicone resins

Traditionally, paints and varnishes have been known to be organic coatings. By this I mean that the oils and resins used in their manufacture are based on the chemistry of the atom carbon, and are derived from nature as the results of life process in one form or another. In the silicone resins, we depart from strictly organic resins by the substitution of the silicone atom for carbon in the skeleton of the resin. In effect, we have a hybrid, half organic and half inorganic.

The outstanding characteristic of silicone resins is resistance to heat. This results from the displacement of carbon, which has always placed an

(Continued on page 51)

Prefabricated building houses new diesel repair shop on Reading

After fire destroyed its diesel repair facility at Newberry Jct., near Williamsport, Pa., the Reading erected a 60-ft by 302-ft Armco rigid-frame building, with Steelox side walls and corrugated metal roof panels, to house the diesel-repair work. The building enables all equipment and operations to be housed under one roof. The facility has a capacity of 24 diesels a day.

The shop (right) has one track running its entire length and includes a pit and two elevated platforms with a lube-oil station on one side. Doors 16 ft wide and 19 ft 5 in high are provided at each end. The building also contains two offices, a locker and lunchroom, and a restroom, which are partitioned off from the shop by Steelox panels. The interior of the building is neither finished nor insulated, except for the walls of the small rooms which are finished with rigid insulation. Ceilings are insulated with 2-in glass-wool blankets. The shop area is heated by 360,000-Btu steam-fed heaters, the small rooms by 20,000 Btu heaters. Lighting for the shop is furnished by fluorescent fixtures suspended from the roof.



News briefs in pictures . . .



New machine developed for mass production of concrete ties

The American Concrete Crosstie Corporation has announced the development of an automatic machine for the mass production of the MR-1 prestressed concrete tie. It is stated that the machine is capable of turning out a complete tie every 26 sec. The machine was manufactured under license by the Link-Belt Company and features complete automation of every phase of the operation, from introduction of the unstressed pallet to storage and distribution.

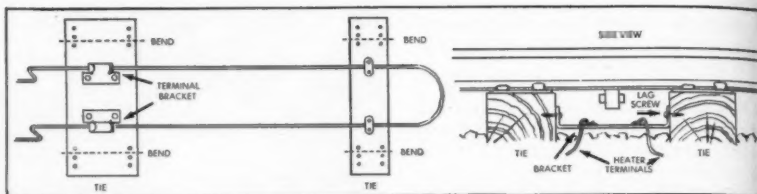
The first step in the production of a tie is the movement of an unstressed pallet on roller conveyors to the wire-feeding and strand-guide station. There four strands are fed into the pallet and secured with end grips. The pallet then goes to the stressing station where a tension of 20,500 lb is applied to each strand. The stressed pallet next moves onto the vibrating table where a mold box is positioned to form the tie. An extremely dry, ultra-high-strength concrete mix is then deposited and vibrated. Bolt holes are formed by pins which move upward through the pallet while it is being vibrated. The tie is cured for 14 hours in a steam curing chamber after which it is transported by overhead equipment to storage and distribution areas.

Prevents freeze ups with . . .

Switch rod heater

BASED on a simple design, the new Rails switch-rod heater is claimed to protect switch rods fully from freeze-ups or icing in cold or snowy weather. The heater is installed under the switch rod by attaching leads from the heating supply to brackets which are attached to the adjacent ties. The manufacturer recommends that the new heater be used with its Elec-Time heater or tubular heaters.

The switch rod heater is made from cor-



rosion resistant alloys and is moisture proof. Physical and electrical characteristics conform to AAR specifications. The unit is normally supplied for operation at 1800

watts but can be supplied for any wattage required. Voltage ratings are available up to 600 volts ac or dc. *The Rails Company, Dept. RTS, Maplewood, N. J.*



Propane gas used by . . .

New weed burner

A NEW weed burner is available which uses propane gas as a fuel for the burner heads and also for the propelling and hydraulic engines. Known as the Fairmont W56 Series A, the machine is equipped with burner-head assemblies that are positioned hydraulically. The manufacturer states that the head assemblies can be placed in a vertical position, rotated horizontally or tilted to side and rear. *Fairmont Railway Motors, Inc., Dept. RTS, Fairmont, Minn.*



MODEL 3022 is a 30-ft wide double-cantilevered canopy. It is supported by columns with a walkway between them.



CUSTOM FLAT ROOF CANOPY is available in widths up to 40 ft. It is supported by box beams resting on pipe columns.

Announces new line of . . .

Steel canopies

FOUR MODELS of architecturally designed steel canopies for commercial and industrial structures have been announced. The manufacturer states that the canopies enhance the appearance of the structures while at the same time offering effective weather protection. The four models available include two double cantilevered canopies, Models 3021 and 3022, a free-standing, single cantilevered canopy, Model 1520, and a custom flat roof canopy. Each model has a weathertight roof comprised of Armco interlocking Steelox panels which are coated with aluminum or zinc to reflect

the sun's rays and to resist corrosion. The new canopies are designed and engineered to meet building code requirements and can be erected without disturbing normal operations, according to the manufacturer.

Model 3021 provides a canopy 30 ft wide supported by a row of single V-columns which are spaced to provide 20-ft bays. The roof protrudes 10 ft beyond the end columns. Model 3022 has the same dimensional ranges as Model 3021 but is supported by two rows of tapered columns which are separated to provide a walkway between the columns. Model 1520 provides a canopy 15 ft wide. It is supported by offset, angled columns which are spaced to provide 20-ft bays.

The custom flat roof canopy provides

widths up to 40 ft and a variety of post spacings and clearance heights. The roof of this model is supported by box beams resting on pipe columns. *Armco Drainage & Metal Products, Inc., Dept. RTS, Middletown, Ohio.*

Hydraulic Drive for . . .

Vertical drills

THE KA-MO vertical drill is now available with a hydraulic drive. Known as Model H140, the drill is shown mounted in pile-driver leads in the accompanying illustration. The power plant developed for use

With Morrison Metalweld Process Reconditioning

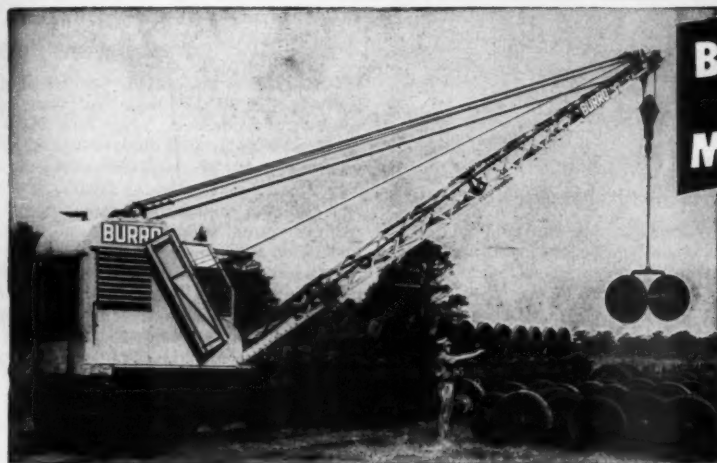
Worn Frogs, Crossings and Switch Points Take on New, Longer Life

and you save the cost of replacements

It costs no more to thoroughly recondition frogs, crossings and switch points than the labor expense of replacement. If reconditioning is done well—before excessive wear does damage—trackage is restored to "good-as-new" condition at a fraction of the cost of replacements. This is the service that Morrison Metalweld Process has been performing for more than 30 years for the nation's leading railroads and industrials—reconditioning by welding "in track under traffic"—no delays, no demurrages. Every Morrison job is done at a predetermined price—all work fully **GUARANTEED**. We'll inspect your trackage and give you a complete survey, without obligation, on the advisability and economy of reconditioning.



RAILWAY SUPPLY CORP.



BURRO WORK POWER
means...
MORE EARNING POWER

Unloading car wheels with a Burro. The Burro moved the flat car into position and will haul it away when wheels are unloaded.

This job—handling wheel assemblies in and out of storage—won't support high costs. That's why a Burro is doing the job.

Any job—on the line, in the yards, or Stores Department—can be done profitably with a Burro because Burros are fast, efficient workers with hook, magnet, tongs, bucket or drag-line. Fast travel speeds and heavy draw bar pull enable the Burro to go to the job in a hurry—and even haul its own cars with it!

Write for Bulletins and more information about Burro cranes. There is no obligation.

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Sylvester Steel Products Co., Ltd., Lindsay, Ontario



CULLEN-FRIESTEDT CO.,
1301 S. KILBOURN AVE. CHICAGO, ILLINOIS

Products (cont'd)

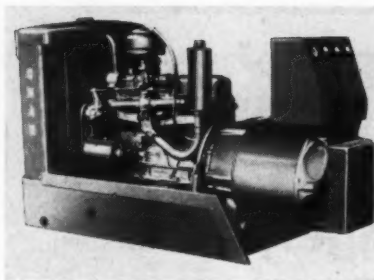


with the drill consists of a Wisconsin 56-hp, four-cycle, air-cooled engine which drives two gear-type pumps, one a 70-gpm, 3-in gear-type pump for operating the boring motor and the other a 17-gpm, 1-in, gear-type pump for driving the feed track. The auger is driven by a Dennison Model TME6 hydraulic motor which develops up to 4600 ft-lb of torque. *Kwik-Mix Company, KAMO Tools Department, a Division of Koehring Company, Dept. RTS, Port Washington, Wis.*

Magneciter generator for . . .

Electric plants

FORMERLY available only on larger engine generator sets, the Onan Magneciter generator is now standard on all gasoline and diesel plants of 25 kw and larger. The



manufacturer states that the Magneciter generator with static exciter and voltage regulator will provide more efficient performance in both primary and standby applications. Advantages claimed for the generator include elimination of rotating exciter, no moving parts or multiple delicate contact points in the voltage regulator, and rugged coils and windings that will not go out of adjustment.

Onan 25,000-watt gasoline plants (Series 25EC) are stated to be complete electric generating sets. The 69-hp engine, Magneciter generator and control panel are assembled into one compact unit. The new Onan electric plant is rated at 31.25 kva at 0.8 power factor and is available in all standard 50 and 60-cycle voltages up to 600 v. *D. W. Onan & Sons, Inc., Dept. RTS, Minneapolis 14, Minn.*



Two gear ratios for . . .

New chain saw

A NEW Remington professional-duty, gear-driven chain saw is available which is claimed to give the cutter a high degree of convenience and working ease through two convertibility features. The new saw, known as Model SL-5G, is designed to permit quick, simplified gear-ratio change-over for either heavy-duty or extra-heavy-

duty cutting jobs. Gear ratios of 2 to 1 and 3.2 to 1 are available. Installation of the selected ratio is made simple by the use of special pinion assemblies, it is claimed. The saws are equipped at the factory with whichever gear ratio the customer selects, the alternate pinion assembly being offered as an accessory.

The manufacturer states that the design of the new gear-train transmission permits easy changeover from one gear ratio to another in a matter of minutes. The transmission design also permits mounting the saw's guide bar either at the centerline or at the right side. This feature is stated to provide a convenience to cutters wanting such a dual-purpose feature for bucking and low stump cutting. Both straight bar and pinchless bow styles of cutting bars are available. The straight bars are equipped with a 2½-in diameter roller-bearing nose with the roller plates made of a special high-strength steel. *Remington Arms Company, Inc., Dept. RTS, Bridgeport, Conn.*



Improvements made to . . .

Mobile welders

MOBILITY of the Hobart self-contained, self-propelled Weldmobile has been improved by the use of larger rear wheels, equipped with Ground Gripper tires, implement-type front tires and increased ground clearance at both axles. Available in 400 and 600-amp models, the multi-range, direct current arc welder utilizes one engine, directly coupled to the generator, for transportation, welding and operating supplementary tools and lights. In addition, the unit is equipped with a draw bar for towing trailers or other equipment. Towing capacity is rated at 2,000 lb. *Hobart Brothers Company, Dept. RTS, Troy, Ohio.*



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Work for division welders

When a division welder and helper finish repairing the frogs, switch points, stock rails and guard rails at one town, what other constructive work should they do before moving on to the next town? Describe in detail.

Roadmaster outlines work

By J. C. BLACKBURN
Supervisor of Welding MW
Seaboard Air Line
Jacksonville, Fla.

On our railroad we have 25 two-man division welding gangs (a welder and a welder helper). These two-man gangs have to do the track welding work for 35 roadmaster districts. Some of these gangs are assigned to one roadmaster district only, while other gangs are assigned to two roadmaster districts.

Our policy is for the roadmaster to furnish the division welder a line-up of the work he wants done on his district. This is a written list of worn frogs and switch points, driver burns, battered joints, etc., given according to their location and importance. If an emergency should arise, the division welding gang corrects the emergency and then returns to the listed work, starting where it had left off.

We feel that the roadmaster is in the best position to know the welding

work that needs to be done on his district. It is not economical for a division welder to make the decisions as to what constructive work needs to be performed; these decisions should always be made by the roadmaster on whose district he is working.

The welding supervisor is responsible for the methods used and the quality of the work performed by the welding gangs.

Depends on kind of housing

By R. L. TUCKER
Supervisor of Track
New York Central
Bucyrus, Ohio

If a division welder and helper finish their regular work during the week, and provided they are housed in a trailer, I would move them at any time during the week, since they would have to move themselves and no extra lost time would be involved.

Of course, when one of these gangs

is housed in a camp car, as some are, it poses a different problem. However, to avoid complete loss of this manpower due to moving the camp, I would not have it moved until the weekend. If all the work mentioned in the question has been done and if no welding is needed on equipment, these men can be used to do regular track work. Any time any employee is idled due to break-down of equipment or completion of his special work, whether operator or laborer, he can be used in regular track maintenance until such time as repairs are made or the camp is moved.

Can do many jobs

By A. WISMAN
Supervisor Work Equipment and Welding
Central RR of New Jersey
Elizabethport, N. J.

With reduced forces and deferred maintenance, there are many things which welders and grinders should do before leaving a job site.

Welders are primarily used to repair switch points, frogs and make run-off welds on running rails against new or second hand frogs and points.

Grinders are used to recess stock rails, reshape switch points and keep switch points and stock rails free of overflow, or burr as it is called by some track-maintenance people. The

NEW QUESTIONS to be answered in February

Do you have an answer to any of the questions listed below? If so, send it in. Payment—based upon substance and length—will be made for each published answer. If you wish your name withheld, we'll gladly comply.

DEADLINE: December 30

- 1. In view of the oil film which sometimes forms on the running rails, on what track machines, if any, would it be advantageous to have rail-sanding devices? Explain.
- 2. How should jetties be located in silty or sandy stream beds to con-

trol channel and high-water currents during floods, as well as to protect the banks from scour? Describe the procedure in detail.

- 3. What is the best way to cut heavy hydraulic hose used on track machines in the field? How are the fittings connected? Explain.

- 4. What factors determine when it is necessary to tuck-point masonry structures? What is the proper procedure relative to the selection, mixing and application of the materials for assuring a durable tuck-pointing job? Explain.

- 5. What types of automatic starters are available for switching on electric or igniting gas switch heaters at outlying locations? Describe how they work.

Send answers to:

What's the Answer Editor
Railway Track & Structures
79 West Monroe Street
Chicago 3, Illinois

Do you have a question you'd like to have answered in these columns? If so, please send it in.

What's the answer? (cont'd)

latter increases the life of the switch points in track.

Welders and grinders, before leaving a switch or frog location, should check the following points of maintenance and make any corrections or adjustments they can:

- (1) Bolts in joints (tighten or renew)
 - (a) Stock rails
 - (b) Heel of points
 - (c) Legs of frogs
 - (d) Frog bolts

- (2) Switch rods
 - (a) Tighten all bolts
 - (b) Renew if needed—cotter pins
 - (c) Weld up and redrill badly worn holes in rods
- (3) Adjust switch points to stock rails
- (4) Check switch stand
 - (a) Re-spike if loose
 - (b) Renew if necessary
- (5) Check switch lamps, if used
 - (a) Renew lenses, if needed.
 - (b) Check wicks (trim and clean)
 - (c) Renew targets or reflectors, if needed
- (6) Tighten guard rail bolts
 - (a) Check gage of guard rails
- (7) Grind off overflow in flangeways of frogs and crossings

Double-capping a timber bent

Under what conditions is it advisable to double-cap a bent of a timber bridge? Explain. Should the additional cap be the same size as the existing one? Why? Describe best procedure for carrying out such work.

Reasons for double-capping

By J. W. CARMAN
Assistant Bridge & Building Supervisor
Missouri Pacific
Wynne, Ark.

There are several reasons for double-capping a bent of a timber bridge:

(1) If some of the piles have settled, cutting and double-capping will make the bent ride more smoothly than if it had shims under the cap on top of the settled piles. (2) Where there is an excessive amount of shims or sub-cap, by cutting and double-capping the bent, you will have less friction and you can hold a better surface on the bridge. (3) If piles have started to decay at the top, and if noticed in time, cutting and double-capping the bent would eliminate this decayed material. To prolong the life of the piles treat the pile head with hot creosote oil and tar pitch, and apply two layers of felt paper.

The additional cap should be the same size as the existing one, preferably 14 in by 14 in by 14 ft. This makes a better bearing for the stringers, and the cap covers the piles better.

The sway braces should be removed from the bent so a straight edge can be placed on the pile at the desired height, and drifts pulled or pile anchors removed so the pile can be readily cut. Chord clamps should be placed on the bent next to one that is to be cut, and the deck and stringers jacked up to take the weight off the

bent so the shims or subcaps can be removed. Use a derrick car to pick up the cap and hold it while the piles are cut. Cut the piles, treat the pile heads and then lower the cap into place. Place additional cap on this one and fasten to piles with pile anchors. Use pile anchors to fasten the caps together. Place sway braces back on bent, and fasten the chords back to cap with chord straps.

When ballast raise is made

By G. P. SMITH
Bridge & Building Supervisor
Northern Pacific
Missoula, Mont.

The only condition under which a timber-bent bridge should be double-capped is when there is a ballast raise which would require that the bridge be raised 8 to 12 in. If a double cap is used, it should be of the same width and should not exceed the thickness of the existing cap. The top cap should be bolted to the bottom cap with three pieces of $\frac{3}{4}$ -in bolts, one at each end and one in the middle of the cap.

On a pile-bent bridge, it may be practical to double-cap the bents if the condition of the tops of the piles is poor, and if, by cutting off 12 to 14 in, it is possible to attain reasonably sound timber. On the Northern Pacific, we use 14-in by 14-in caps, 14 ft long. In double-capping we use 14-in tim-

ber and usually have a truck to move around with. A small supply of necessary bolts, pins, washers and spikes will take care of their needs, along with a limited number of tools and spare parts for switch stands, switch lamps and derails.

Under such a plan of procedure, if carried out as explained, the efficiency of railroad maintenance would be greatly increased, thus eliminating the necessity at a later date of dispatching a gang to take care of trouble in such areas.

bers and bolt them together with $\frac{3}{4}$ -in bolts.

The placing of a double cap is a simple operation involving jacking up the deck, removing the old cap, cutting the piling to desired height, and placing the double cap.

If a bent is double-capped due to a ballast raise, the procedure is to set the jacks, raise the deck to the required height, and place the second cap on top of the existing cap and bolt them together.

Tells how to do it

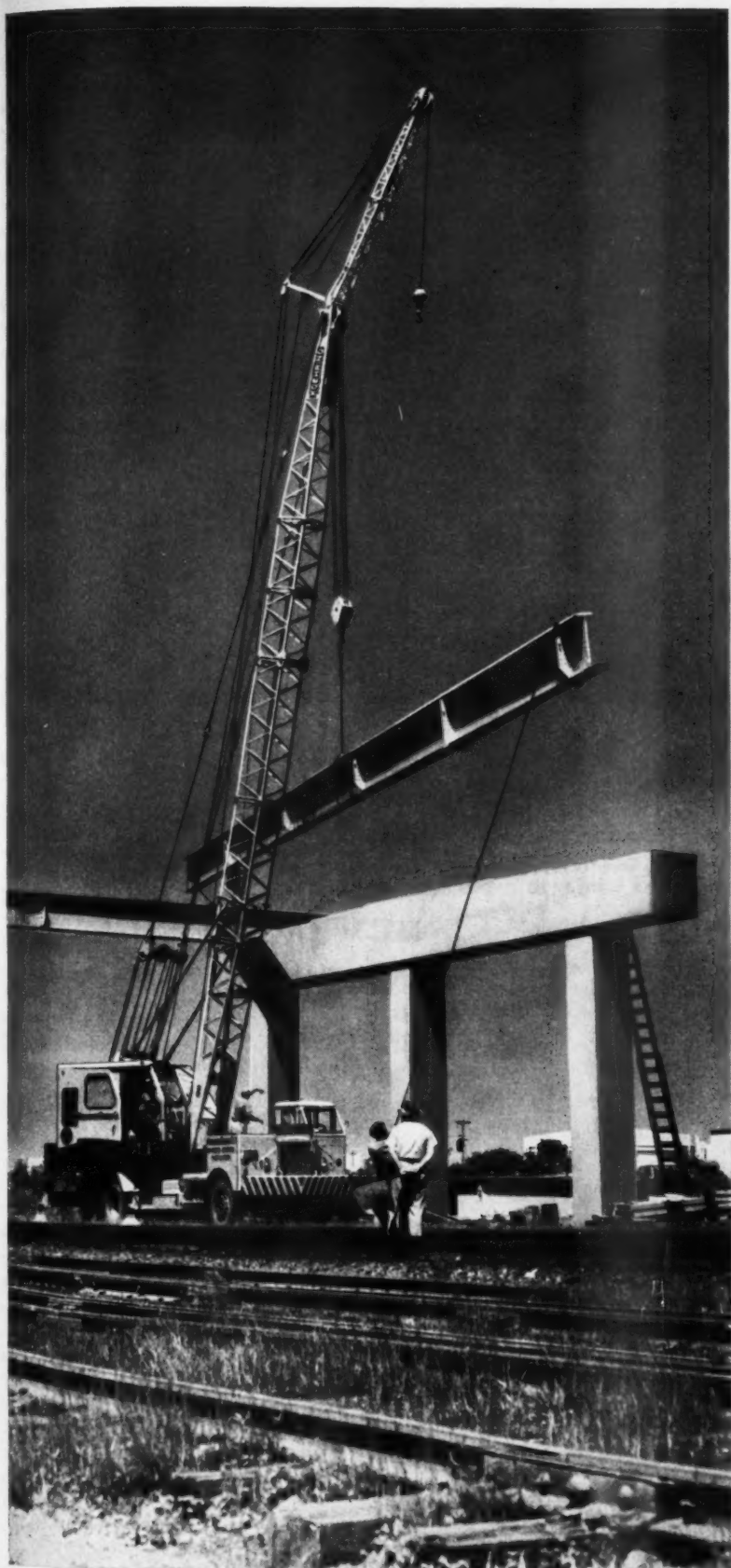
By A. B. WANG
Supervisor Bridges & Buildings
Monon
Lafayette, Ind.

Under certain conditions, if more than three piles of a five-pile bent are bad at the top, it is advisable to double cap. If only one or two piles have bad tops, I would only subcap them.

I would make the additional cap the same size as the original to equalize the load and to give a smooth surface for cross bracing. The following procedure is recommended:

Swing the existing cap by chains and step jacks from the rails. Secure the raise needed by pulling spikes and raising rail on adjoining bents. Using a level board for accuracy cut off the piling to the height needed for new cap. Swing in the new cap with a derrick car, drift new cap to piles and drift old cap to new. Apply new cross bracing to bear fully on both caps and piling.

Under another condition it is advisable to double cap due to track raise. Here I would apply jack blocks by chains to the piling under the old cap, set up blocking or posts and with



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KOEHRING
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Milwaukee 16, Wisconsin

K7

What's the answer? (cont'd)

hydraulic jacks raise trestle by 3-in lifts on old cap until height for new cap is available.

To carry old piling

By G. P. SLAGLE
Chief Carpenter
Milwaukee Road
Milwaukee, Wis.

Double-capping a bent is advisable only when it is necessary to carry old piling for a time to wear out the floor on a bridge. We should only double-cap bents that are over ten feet in height. If the height is less than 10 ft a bent should be framed for better stability.

It is desirable to apply a cap of the same size as the original cap when making these repairs. It is also advisable to place the additional cap on the bottom or on the new cut-off. The rail pile in a five-pile bent should be cut

to determine its condition for a double cap.

It is desirable to double cap a bent and separate them with a shim three inches thick or over. A smaller shim deteriorates more rapidly and tends to crush.

Under various conditions

By Y. C. BEAM
Master Carpenter
Seaboard Air Line
Americus, Ga.

Conditions that warrant double-capping of bents in timber bridges can be narrowed to the following:

(1) Where the tops of the piles have decayed for the first 12 in to 14 in, a double cap would be advisable. If, after cutting off top of pile for 12 in you find the timber much better, drifts applied from side of pile will give more holding power.

(2) In some locations where bearing is obtained by skin friction of the piles, and the caps have a tendency to

bend downward in the middle, double-capping will solve the problem. Double-capped bents will not have a tendency to bend in the middle.

(3) Double-capping is necessary if it is found that the original cut-off of piles was not on a perfect plane. Very often it is found that in sawing piles the saw was allowed to veer down or up, causing high and low edges on the piles. Double capping will get results if the piles are cut perfectly level.

(4) On some territories where it is difficult to get solid bearing for timber piles, the bents might in time settle to one side causing the trestle to get out of cross level. This condition will happen in locations where lime sinks are found. While double-capping might not be the complete answer it affords temporary relief and sometimes will take care of the situation for years.

In conclusion, I might stress the point that in double-capping a timber bent it is important that the piles be cut to perfect cross level and on a perfect plane.

Repairing heaved road crossings

In winter, what steps can be taken to correct a situation where a highway crossing has heaved badly? Explain in detail. What special measures can be taken before winter to avoid such occurrences?

Shimming most economical

By A. J. MURPHY
Supervisor of Track
Lehigh Valley
Auburn, N.Y.

In case of a crossing that has heaved badly in severe winter weather, the most economical way to improve the situation would be by shimming and bracing the rails, or, as a last resort, through the use of salt, before being compelled to dig down with off-track and portable equipment in order to maintain scheduled speeds on the particular section of track.

A heaved crossing is caused by lack of proper drainage. To avoid a recurrence, surface ditches should be constructed if required, and ample sub-drainage installed with suitable inlets and necessary provision for cleaning, the purpose being to drain the sub-grade thoroughly and prevent the formation of water pockets. With modern methods and off-track and portable

equipment, this can be accomplished with practically no delay to traffic and more economically than the methods formerly used to rectify such conditions.

Advocates rock salt or oil

By A. D. HENNINGER
General Roadmaster
Soo Line
Minneapolis, Minn.

There is little that can be done during the winter to correct this situation other than to smooth the track by shimming and to place slow orders where necessary.

Primarily, frost heaves are caused by trapped moisture. The track heaves rough because of the variation in the moisture contained in the various types of soil.

The most satisfactory and permanent method of correction would be to drain the moisture away from the

crossing, either by ditching or placing permanent drains. This method, however, could be quite expensive in some types of highway crossings. Deep heaves such as referred to in this question can be reduced by the use of rock salt, waste oil or other low-grade oil or chemicals.

The application of rock salt applied in holes dug by a post auger to the desired depth and spaced 2 to 4 ft apart in a diamond pattern, allowing 15 to 25 lb of salt per hole, has effected an 80-per cent to 100-per cent correction of heaving.

Oil has proved to be nearly as effective as salt when applied in the same manner, allowing two to three gallons per hole.

Possibly the most economical method of heave elimination in heavily traveled highway crossings would be the application of oil or salt brine with a grout injection machine through injection points.

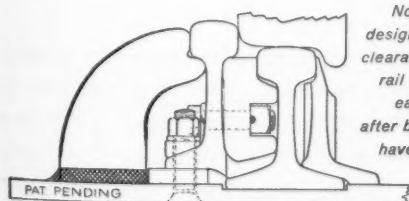
Before a supervisor attempts to eliminate frost heaves in highway crossings, he should first make a study of the results derived from various methods of treatment in the different types of soil in his area. While it is usually desirable to make the elimination as nearly 100 per cent as possible,

(Continued on page 48)



New Improved Switch Point Guard Rail *protects switch points . . . reduces derailments*

Now Bethlehem's famous Switch Point Guard Rail Design 755 has been redesigned to permit quick replacement of the guarding section without interrupting traffic. Just remove bolts, drive out chocks at each end, and you can lift out the guard rail without disturbing the switch slide plates. The new guard slips into place as easily as the old one came out.



Note how newly-designed brace provides clearance around guard-rail base to permit easy guard removal after bolts and chocks have been taken out.

The Design 755 Guard Rail was designed specifically to prevent cutting, climbing, and derailments in yard movements. In operation, the head of the Switch Point Guard Rail stands higher than that of the running rail, easing wheels away from the point to provide safe passage and minimize point wear. The ends of the guard are beveled to soften the shock to car and lading.

The guarding section is fully heat-treated for long life under tough service. The complete assembly is reversible for use on either side of the track. It's one of the most valuable track accessories ever developed. Let a Bethlehem engineer go over the fine points with you.

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.
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The Racor Mechanical Car Retarder applies braking force to both sides of every car wheel that

No skates needed here!

**NEW RACOR® MECHANICAL
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IS COMPLETELY AUTOMATIC!**

*(Patent Applied For)

No skates or skate men are needed in gravity classification yards with this new Racor Mechanical Car Retarder at the end of each track! The consequent reduction in operating expense will amortize the cost of the retarders in a short time. Still further savings accrue from reduced damage to lading through absorption of impact as cars come together.

The Racor Mechanical Car Retarder has been designed to bring rolling cars to a stop at the end of gravity classification yard track and to resist their further movement by the impact of succeeding cars. The

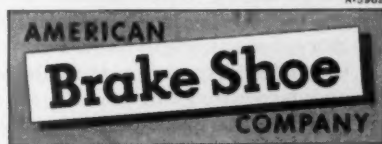


enters it. Once adjusted, it needs no further attention—operation is completely automatic.

retarder consists of spring loaded rails which apply retarding force simultaneously to both rim and flange of each pair of wheels. It applies opposing forces in such a way as to eliminate the possibility of derailment. Retarding action is entirely mechanical, and no difficulty is encountered in moving either the cars or the locomotive through the retarder when the track is being "pulled".

Your American Brake Shoe representative will be glad to make a study of the operation of *your* yard in order to determine the savings that can be derived from the

installation of Racor Mechanical Car Retarders. American Brake Shoe Company, Railroad Products Division, 530 Fifth Avenue, New York 36, N. Y.



In Canada: Dominion Brake Shoe Company, Ltd.

Quality products cut your ton-mile costs



What's the answer? (cont'd)

(Continued from page 44)

the supervisor should use extreme caution so as not to reduce the heave below the surrounding area. This would result in a low spot where the heave previously existed, resulting in a condition which would be far more difficult to correct than the original heave.

Keeps ballast clean

By J. CORBAN
General Roadmaster
Gulf, Mobile & Ohio
Bogalusa, La.

Fortunately on my territory we are not bothered with enough frost to cause heaving in our crossings, but to avoid possible heaving we try to keep clean, well-drained ballast in our crossings, and try to have them all up in

good shape before the winter season begins. In my opinion there should be very little heaving account of frost in any crossing that is properly drained.

To correct a situation where a crossing has heaved badly, about the only thing to do is to endeavor to maintain the crossing in the best and most economical way until the frost is out of the ground and then work it out of face and provide proper drainage.

Cutting strings of welded rail

When it is necessary to make cuts for insulated joints and turnouts while laying continuous welded rail, how should this be done? What cutting equipment should be used? If a power saw, how can the rail expansion be controlled to prevent pinching of the saw? Explain.

Makes cuts with torch

By W. W. CHAFFEE
General Track Supervisor
New York, New Haven & Hartford
New Haven, Conn.

When unloading welded rail, it is the practice on the New Haven to torch cut the rail at insulated-joint locations, and to allow a gap for two single rails. This same procedure is used at turnout locations. Then before the rail is laid these torch-cut ends are sawed with a power rail saw and drilled so that when the rail is laid there is no need for further cutting of the rail. There may be some small adjustments to be made at these locations, which we take care of by driving the rail.

Uses power saw

By M. T. PRUETT
General Track Supervisor
Southern Pacific
San Francisco, Calif.

After continuous welded rail is unloaded in the field, a survey is made to determine exactly where the insulated joints will be located in the track. Then the rail is cut with a power saw and the insulated joint is applied before the rail is laid. This practically eliminates the possibility of pinching the saw. If the saw shows signs of pinching, all that is necessary is to throw a curve in the welded rail each side of the saw and the pinching will stop.

Sawing for insulated joints in continuous rail after the rail has been laid

presents a different problem. If the rail is to be cut in hot weather, arrangements should be made to make the cuts in the early morning when prevailing temperatures are at their lowest. Before such cuts are made anti-creepers should be set each side of the cut locations, so that expansion will be held away from cut; this should eliminate pinching of the saw.

If this expedient does not eliminate the pinching the joint bars should be removed from the nearest joint and the rail uncoupled so that the rails can bypass each other. Of course, in this case, rail anti-creepers would have to be loosened between the uncoupled joint and the cut. After the cut is made it may be necessary to cut off a short section of rail. Where the by-pass method is used the rail would have to be driven back so as to allow the joint bars to be re-applied. Of course any cutting after the rail is laid would be done under flag protection.

On our line the turnouts are cut according to standard before they are shipped and there is very little field cutting to do. When necessary all cutting is done with power saws.

Uses special device

By H. F. GILZOW
Process Engineer
St. Louis-San Francisco
Springfield, Mo.

We have just completed the field testing of a jacking mechanism to enable the cutting of welded rail and ex-

panding it sufficiently for the end post after the rail is laid in the track.

I am attaching a print showing a drilling template (not illustrated here), the jacking mechanism, referred to as SCARE (Saw Clamp And Rail Expander) and an end-post clamp (not illustrated here) for holding the end post in place while releasing the pressure on the SCARE.

We have tried cutting welded rail for insulated joints at different times, and we think that the proper time is after the rail is in the tie plates. The drilling of the holes should be started as soon as possible AFTER the rail is laid in the plates so as to give sufficient time to get the rail expanded and the end post in place before the rail anchors are applied near the joint.

We have detailed plans of the SCARE and would be glad to make them available to any railroad that is interested.

The procedure in applying insulated joints when laying 132-lb continuous-welded rail is as follows:

I Material and equipment required

- (1) Light push car
- (2) Power track drill
- (3) Racine rail saw
- (4) Drilling template with clamps
- (5) Special expanding jack with tools (SCARE)
- (6) Claw bar
- (7) Two lining bars
- (8) Eight-pound maul
- (9) Track wrench
- (10) Track shovel
- (11) Insulated joint complete
- (12) One pair angle bars with bolts

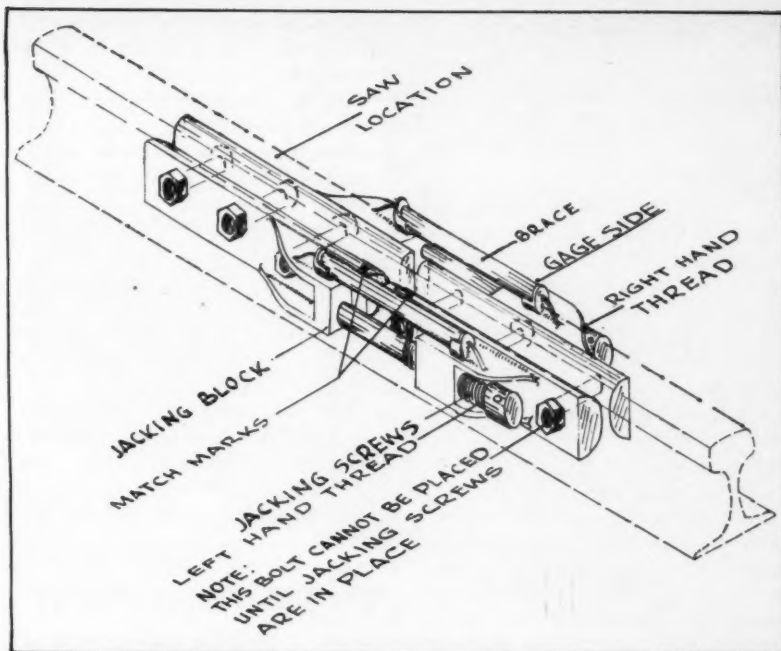
II Drilling rail

- (1) Signal man or foreman will mark location for insulated joint after rail is laid in track.
- (2) Remove spikes and plates each side of crib selected.
- (3) Place template on gage side of rail so that center mark is in center of crib. Place clamp in position under base of rail, if practicable, and tighten loosely. Tap template with maul to secure proper fit and tighten clamp.

- (4) Transfer template center mark to gage of rail. This mark will indicate where saw cut is to be made.
- (5) Drill all six holes through template guides.
- (6) Remove template.

III Sawing rail and placing end post

- (1) Remove all bolts and both jacking screws from SCARE (see drawing).
- (2) Place SCARE in position on previously drilled rail so that rail saw will operate from gage side of rail.
- (a) Bolt the two jacking-block pieces loosely to the rail on same side of the center mark as the saw will operate.
- (b) Bolt the remaining two screw-block pieces loosely to the other rail. (Note: The end bolt cannot be placed at this time.)
- (3) Place the two braces in place, adjust the blocks so that the braces fit snugly, and tighten all bolts.
- (4) Remove the two braces.
- (5) Place saw in position and adjust until saw blade will cut at exact location marked (see paragraph II—Item 4).
- (6) Start saw.
- (7) Place jack screws in proper place (field side screw in left-hand thread), and screw up until ends are just in clear of saw blade. Place and tighten remaining bolt.
- (8) When saw blade has cut into ball of rail to sufficient depth, place braces. These braces will hold saw from binding in the cut until lower jack screws can be engaged.
- (9) When saw has cut a sufficient depth, engage both jack screws and tighten, being careful not to foul saw blade. (Saw will be about three-quarters through



JACKING MECHANISM, called SCARE, was developed by the Frisco to enable welded rail to be cut in track. It expands rail sufficiently for insertion of end post.

- rail before these screws can be tightened.)
- (10) Saw operator will watch saw and, if there is any binding, increase pressure on jack screws.
- (11) When sawing is complete, remove saw blade from holder and remove blade and saw.
- (12) Tighten pressure on jack screws until rail ends are forced apart far enough (about $\frac{3}{8}$ in) to allow end-post to be placed. Work both jack screws together.
- (13) Remove both braces.
- (14) Scrape saw cuttings from sides and end of rails and file off any

burrs left by saw. Under no circumstances place fingers or parts of body between ends of rails.

- (15) Place end-post and hold with special clamp.
- (16) Release pressure on jack screws, allowing rail ends to clamp end-post.
- (17) Remove SCARE and replace bolts and jacking screws in proper place.

IV Placing insulated joint

- (1) Insulated joint to be placed in usual manner.
- (2) If foreman desires, joint may be angle-barred temporarily.

Repair parts for fueling stations

What stock of emergency materials should be carried on hand for repairs to fueling stations? Why? Where should this material be kept?

Dictated by economics

By R. C. McMASTER
Engineering Assistant
Bessemer & Lake Erie
Greenville, Pa.

Service is our main objective in the railroad business. Fueling stations must be maintained in an operating condition to facilitate this objective. Any delay in making repairs to a unit in case of a breakdown means that our power units are put out of use. As a

result, all traffic in that particular area comes to a halt.

Economics dictate that it would be impossible to keep a complete inventory of emergency repair parts at each location. And, from a practical viewpoint, it is also impossible to stock all parts by a given railroad. The frequency of failures in certain parts determines which part should be stocked and at what location they should be kept.

It has been our practice to stock belts, filters, quick detachable couplings, nylon bushings and hose clamps at each fueling station. These are the parts, in our experience, that most frequently need replacing.

Fuel hose, pump motors, by-pass valves, indicator ells, pumps and starter switches are parts which occasionally fail and must be repaired with the shortest delay. The frequency of failure and the cost of these items dictate that they should be kept in a central location, available for immediate delivery to the fueling station site. The quantity of each part to be kept on hand is dependent upon the number of fueling stations on a particular railroad.

(Please turn the page)

What's the answer? (cont'd)

Mechanics carry parts

By W. E. RUSHFORD
Supervisor Water Supply
Chesapeake & Ohio
Columbus, Ohio

On the Hocking division of the Chesapeake & Ohio the water supply department protects only the fueling stations at outlying points. Fueling stations in shop areas are handled by the mechanical department.

However, we do have two locations on the Hocking division which are headquarters for water supply road mechanics, namely, Walbridge, Ohio, and Parsons Yard at Columbus.

These mechanics carry the following material for making emergency repairs at fueling stations: Various size fueling hose and Poage hose couplings; hose for unloading tank cars; filters for pumping stations; packing for pumps; grease for pumps and valves; motor belts; repair parts for fueling meters; and various size gaskets.

At each of the locations mentioned above the mechanical department carries repair parts for pumps and these parts are available for our use at any time. If a new pump or meter is needed these are ordered through the general storekeeper at Huntington, W. Va.

Dual pumps help

By EDWARD R. POUND
Master Carpenter
Baltimore & Ohio
Newark, Ohio

A diesel fueling station with above-ground storage tank should need no emergency repair parts for the overhead tank unloading device to pump oil to storage tanks.

If underground storage tanks are used, diesel oil could be removed from the bottoms of the tanks if allowed by state laws or insurance codes.

To have a dependable fuel-oil pumphouse arrangement, pumps for handling fuel oil from tank cars to storage tanks should be located in the pumphouse. These pumps are also used for pumping fuel oil from storage tanks to the ready track facilities.

Prefabricated steel buildings, which are manufactured by several reliable companies, will meet all requirements for a pumphouse. A dual arrangement of two pumps can be set up so diesel oil can be pumped from tank car to

storage tank, while at the same time oil can be pumped to the ready track for diesel fueling.

With this two-pump arrangement it would not be necessary to have emergency repair parts at various locations. In case of breakdown with one of the pumping arrangements the diesel station can be kept in operation by the use of one pump.

The two-pump arrangement can be operated through one filter tank and filter cartridges should be on hand to change at regular change-out dates or in case of emergency.

If all filter tanks used on the railroad are of the same type and manufacture, the stores department can stock several sets of filters to ship out on line of road, or a set of cartridges could be ordered in advance of the change-out date, or in case of emergency oil can be made to by-pass the filter tank.

If the ready track has two or four fueling standpipes it may be necessary to have on hand at each location one or two fueling hoses and one nozzle. Otherwise there may be serious delay to engines in case of breakdown.

If passenger train service is good the hose and nozzles can be stored at a central location to be forwarded to points out on the line as needed.

Hose, couplings, filler valves

By L. R. PENNINGTON
Supervisor Bridges & Buildings
Chicago & North Western
Chadron, Neb.

We keep the following stock of emergency materials on hand at division headquarters, where they can be picked up by our traveling mechanics and taken any place on the division for making repairs:

Two 25-ft lengths of Buna-N tube, Neoprene cover and circular wire-woven carcass hose.

Two sets of Snyder Super Grip re-attachable couplings for diesel fuel oil hoses. When hoses fail it will only be necessary to order the hose as the re-attachable coupling can be removed from the old hose and installed on the new hose in the field.

We also keep on hand one DPG No. 620, 2-in filler valve with lock and feeder nipple.

By keeping these items on hand at division headquarters, repairs can be made on short notice at any location on the division.

To the editor

Agrees that reliable unit costs are needed

San Antonio, Texas

TO THE EDITOR:

I compliment you on the editorial, "Standards needed for figuring unit costs," in your September issue.

Aside from more revenue, I can't think of anything the railroads need more than some procedure of cost accounting that would truthfully tell them what the real and true costs are for performing their maintenance chores. It certainly is a fact that not only is there a need but an absolute necessity for establishing some standard formula for figuring costs.

Let me be specific, and I speak from experience. As a representative of a company doing contract work for railroads that are not restricted by union agreements, our costs for performing the service and work are considered in one location as being one-half or more of that particular railroad's costs. On another road the contrast is in the opposite direction, i.e., we are 10 to 30 per cent and sometimes 50 per cent higher.

A contractor must know his costs if he wishes to continue in business and remain solvent. The firm I refer to has been in business for 30 years and should know its costs. With a foreman, and five men, plus a flagman, we average out a given amount through a working season. The average price we charge per unit of work, let us say, is \$2.00. I am confronted with costs on the same railroad, for performing the same service, at \$1.00 per unit. A total of 15 men, doing the same work, average less than 50 per cent of the unit production that our eight men produce. So, we have approximately twice as many men doing half as much work at a reported cost of 50 per cent less.

It seems to me the railroads could well afford to pare down their expense of hiring efficiency experts and spend some of that money in developing a cost accounting procedure that everyone concerned could refer to with a feeling of security insofar as accuracy of cost is concerned. So, more power to you in your crusade.

Waldo E. Bugbee

Says two points omitted from editorial on unit costs

New Orleans, La.

TO THE EDITOR:

The editorial in your September 1960 issue on the need for standards for figuring unit costs was very timely and to the point. Comparisons are frequently made between different railroads as to cost of maintenance work, which comparisons may not be valid due to different ways of accounting for these costs.

There are two points omitted from your editorial which have a strong bearing on these comparisons. One is the standard of maintenance. In traveling about the country and seeing what is done on different railroads, one readily recognizes that some

railroads maintain their track and structures to a higher standard than others do. For example, a road carrying frequent passenger service at speeds up to 100 mph would not be expected to maintain the track over which these trains are operated for the same unit costs of another road with only occasional passenger service and that at a maximum authorized speed of 60 mph.

The second point is the frequent use of the maintenance-of-way ratio to compare maintenance practices on two roads. This compares the dollars spent for maintenance to the total dollars of revenue. Actually, maintenance costs do not come about from dollars of revenue but rather more from ton-miles handled. A much better ratio to study, if it were available, would be the dollars per ton-mile spent on the different roads. This, of course, would have to be considered in the light of the maintenance standard decided upon by the individual road as mentioned above.

You have performed a service to all of us by drawing editorial attention to the need for better comparative figures.

R. H. Peak
Division Engineer
Illinois Central

Resins in paints

(Continued from page 36)

upper temperature limit on organic coatings. Carbon compounds burn at high temperatures, just as coal burns.

Silicone resins may be used in small proportions to modify characteristics of other coatings. They are also used in dilute solutions to waterproof concrete, leather, paper and other materials. They are highly water repellent.

Synthetic rubber

Natural rubber has never found general use in paints because of the difficulty of putting rubber into clear solution and the need for vulcanizing to produce a cured film. Strong solvents are required to dissolve rubber.

Certain synthetic-rubber resins can be dissolved in common solvents, such as xylene, and are useful for making paint. These resins dry rapidly by solvent evaporation. In fact, they dry so quickly that they are hard to brush.

In spite of the brushing problem, they find use in certain areas where the properties of the resin are needed. They are quite resistant to acids and alkalis and have been used with good success as coatings for concrete. For exterior use they are frequently used in undercoaters for masonry surfaces. They seal alkaline surfaces effectively in preparation for painting with conventional paints. For interior use they may be applied directly to concrete



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Presses anchor to tie for positive grip

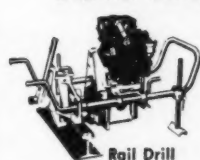
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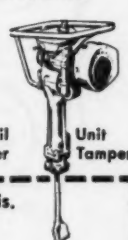
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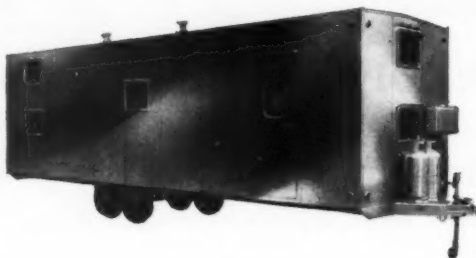


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Resins in paints *cont'd*

walls or floors. Since they contain no oil or driers, they have been used to make fume-resisting interior-wall paints.

Chlorinated rubber coatings

Natural rubber can be treated with chlorine which changes the nature of the rubber, yielding a resin in the form of a white powder soluble in coal-tar solvents. Properly plasticised, this resin produces a coating with outstanding chemical resistance.

Latices

In our discussion thus far we have set the stage for the topic of latex paints. Certain resins are available today which have very interesting and useful properties but are difficult to use in solution form for architectural painting. I am referring to vinyl, acrylic and synthetic-rubber resins.

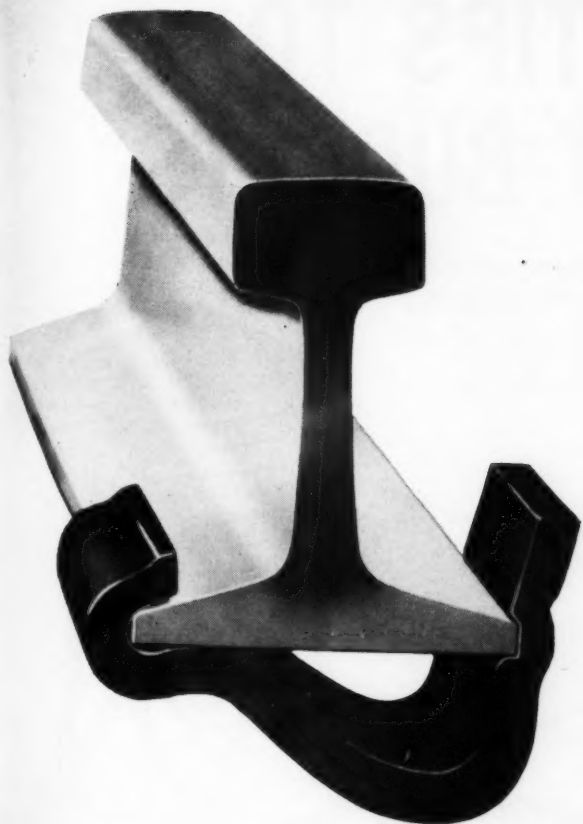
All of these resins require strong solvents to dissolve them. They dry so rapidly that they are difficult to brush. Considerable solvent is required to reduce these resins to application viscosity. As a result, the coatings are usually low in solids. Much of the expense of using these resins goes to pay for the solvent, which serves only to distribute these coatings on a surface and quickly evaporates, contributing nothing to the film.

Fortunately, these resins are now available in latex form. In latex paints the resin is not dissolved, but is dispersed in very tiny particles surrounded by water, forming an emulsion.

There is considerable cost savings in using the resin in latex form rather than as a dilute solution in expensive solvents. The advantage of a latex is the savings in solvent cost, plus the ease of application and clean-up, which results from using a water system, and the lower fire hazard.

There are three general types of latices used in emulsion paints. These are styrene butadiene, polyvinyl acetate and acrylic. Styrene butadiene points have been used in this country for over 10 years. They are low in cost, and, although their largest volume use is in the interior field, they are not restricted to that area.

The newer polyvinyl acetate and
(Continued on page 56)



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6 TEXACO TIPS TO EXTEND TIGHT BUDGETS

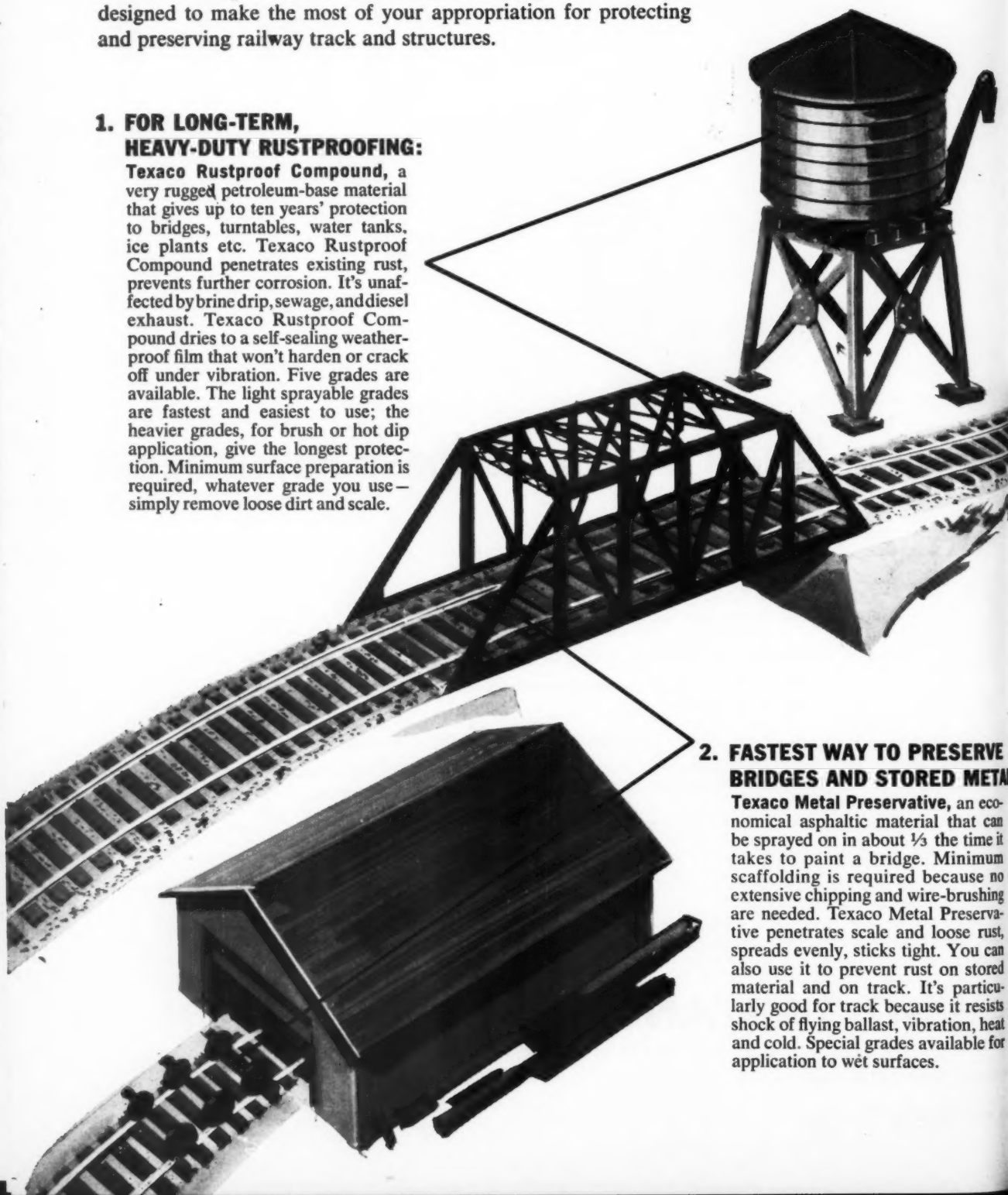
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Texaco Rustproof Compound, a very rugged petroleum-base material that gives up to ten years' protection to bridges, turntables, water tanks, ice plants etc. Texaco Rustproof Compound penetrates existing rust, prevents further corrosion. It's unaffected by brine drip, sewage, and diesel exhaust. Texaco Rustproof Compound dries to a self-sealing weatherproof film that won't harden or crack off under vibration. Five grades are available. The light sprayable grades are fastest and easiest to use; the heavier grades, for brush or hot dip application, give the longest protection. Minimum surface preparation is required, whatever grade you use—simply remove loose dirt and scale.

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Texaco Metal Preservative, an economical asphaltic material that can be sprayed on in about $\frac{1}{3}$ the time it takes to paint a bridge. Minimum scaffolding is required because no extensive chipping and wire-brushing are needed. Texaco Metal Preservative penetrates scale and loose rust, spreads evenly, sticks tight. You can also use it to prevent rust on stored material and on track. It's particularly good for track because it resists shock of flying ballast, vibration, heat and cold. Special grades available for application to wet surfaces.



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3. HOW TO PREVENT TRACK RUSTING, KINKS, PULL-IN-TWOS:

Texaco 904 Grease X, a graphite product that works into the bolts on rail joints, minimizes wear and rusting, reduces bolt replacement costs. Once the 904 Grease X is pumped into the rail joint it's held in place, and protected against entry of brine, moisture and cinders, with end plugs of Texaco 1407 Plastic Car Cement H. It's not necessary to take down rail joints to apply 904 Grease X, so there's no interference with traffic, and an application of 904 Grease X with sealer can last eight or ten years.

4. HOW TO PRESERVE WOODEN PILINGS AND POLES:

Texaco Protexacote, a tough combination of asphalt, asbestos and wood preservatives that seals out water, air, bacteria and fungi, and seals in the original wood preservative. Protexacote is designed for application to poles and pilings at ground level and below, where the most severe damage usually occurs, but it's also an excellent sealant for the tops of poles and the ends of crossarms. A good antirust for pole hardware, too. Protexacote can be brushed or sprayed on at summer temperatures.

5. SURE WAY TO EXTEND SERVICE LIFE OF WOODEN BRIDGES:

Texaco Liquid Bridge Cement, a low-cost coating that can be applied with mops or brushes, or cut back for easy spraying. Makes ties, stringers and decking last longer because it waterproofs them, prevents the cracking and splitting that opens them up to frost damage. Tests and actual use-records show that an application of Texaco Liquid Bridge Cement can last more than eight years, and it costs only a few cents per tie.

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Resins in paints

(Continued from page 52)

acrylic emulsions are used in both interior wall paints and exterior finishes for stucco, brick, concrete and wood surfaces. Acrylic paints are higher in cost than polyvinyl acetate paints, and both are generally higher in cost than styrene butadiene finishes.

Since emulsion paints do not penetrate as much as oil paints, it is recommended that all exterior wood surfaces and chalky painted surfaces be first primed with an oil primer or oil-type surface conditioner before being painted with two coats of emulsion paint. Emulsion paints should not be applied at temperatures below 50 deg F.

The latex paints introduce still another form of drying. As I have told you, the resins are small discreet particles dispersed in water. When the water evaporates, these particles touch together and on contact flow or "melt" together to produce a film. This phenomenon is called "coalescence." While latex paints dry by evaporation and coalescence, this is not a reversible process. Once dry, these coatings will not dissolve in water. Anyone who has tried to clean a brush containing old latex paint knows this.

In addition to the types of paints we have discussed, there are still other types. To extend the picture further, there are hybrids in which two or more types of resin are mixed in one paint. When properties in between two types are needed, often these properties can be obtained by using more than one type of resin. You can see that the possibilities become infinite in number.

You may wonder why we have so many types of resins. There is a good reason. As new resins are developed we use them, but we also continue to use the old ones. It is like the textile industry. New synthetic fibers are wonderful, but we still use lots of cotton and wool. In the paint industry, we still use lots of linseed oil and probably will for years to come.

While it is a good thing for anyone concerned with applying paint to be oriented regarding the major types of paint, it is even more important that you know what they will do. It is practically impossible for anyone to know all the details of their composition unless he devotes full time to the task of learning them.



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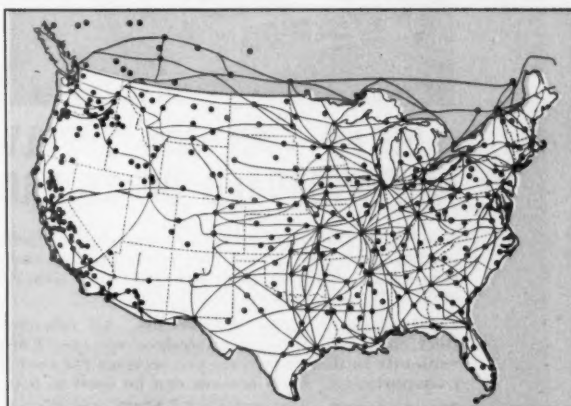
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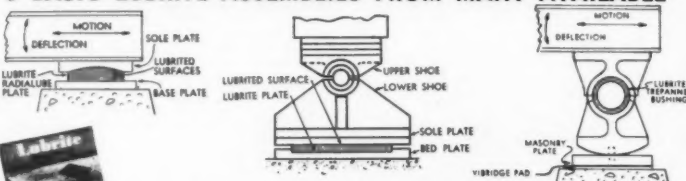
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Biographical briefs

(Continued from page 10)

with a Bachelor of Science degree in civil engineering. Mr. Collinson entered the service of the B&O in 1946 as an assistant engineer at Pittsburgh. He was promoted to maintenance inspector at Baltimore in 1947, assistant division engineer at Newark, Ohio, in 1950 and division engineer there in 1952, serving also in that capacity at Cincinnati, Ohio, and Akron and at Baltimore. He was serving at the latter location at the time of his recent promotion.

William H. Giles, 68, who recently retired as assistant chief engineer of the Missouri Pacific at St. Louis, Mo. (RT&S, Sept., p. 10), was born at Little Rock, Ark., and received his higher education from the extension division of Washington University. Mr. Giles commenced his railroad career in 1914 as a ballast inspector at Little Rock, later being promoted to rodman and instrumentman. He was further promoted to assistant engineer at Poplar Bluff, Mo., in 1917, serving also in that capacity at St. Louis, Mo., and to engineer of design in 1937. Mr. Giles was advanced to assistant chief engineer at St. Louis in 1951.

Walter E. Quinn, 58, who was recently promoted to principal assistant engineer of the Louisville & Nashville at Louisville, Ky. (RT&S, Aug., p. 10), was born at Sturgis, Ky., and received his higher education from the University of Kentucky. Mr. Quinn entered the service of the L&N in 1923 as a rodman at Ravenna, Ky., being promoted to instrumentman there two years later. He was further promoted to assistant engineer at Ravenna in 1937, serving also in that capacity at Louisville, and to assistant division engineer at Birmingham, Ala., in 1944. Mr. Quinn was advanced to special engineer at Louisville in 1951, the position he held at the time of his recent promotion.

Charles E. Stoecker, 47, who was recently promoted to special engineer of the Louisville & Nashville at Louisville, Ky. (RT&S, Sept., p. 10), was born at Louisville and graduated from the University of Kentucky in 1936 with a Bachelor of Science degree in civil engineering. He entered the service of the L&N in 1938 as a rodman and draftsman at Louisville, being promoted to instrumentman at Middlesboro, Ky., in 1939. Mr. Stoecker also served in that capacity at Birmingham, Ala. From 1940 to 1945 he was in military service with the U. S. Army, serving as an infantry officer in the Pacific Theatre of Operations. He was ap-



Walter E. Quinn
L&N



C. E. Stoecker
L&N

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^{*} Your inquiries for detailed information on Multi-Gang and other track machines are invited.

Biographical briefs (cont'd)

pointed assistant engineer on the L&N in 1945. Mr. Stoecker was promoted to assistant supervisor bridges and buildings at Mobile, Ala., in 1946, assistant division engineer at Evansville, Ind., in 1947 and division engineer at Mobile in 1952, serving also in that capacity at Knoxville, Tenn. He was named miscellaneous engineer at Louisville in 1958, the position he held at the time of his recent promotion.

Clarence Baker, 58, who was recently promoted to assistant chief engineer of the Missouri Pacific at St. Louis, Mo. (RT&S,

Sept., p. 10), is a native of Carbondale, Ill., and graduated from Rice Institute in 1922 with a Bachelor of Science degree in mechanical engineering. Mr. Baker entered railroad service in 1922 with the New Orleans, Texas & Mexico, then a subsidiary of the MP, as a chainman at Houston, Tex. He was promoted to assistant engineer there in 1927, also serving in that capacity at Kingsville, Tex. Mr. Baker was further promoted to principal assistant engineer at Houston in 1942, superintendent of construction at Krotz Springs, La., in 1948 and engineer of design at St. Louis in 1955. He was advanced to construction engineer the following year, the position he held at the time of his recent promotion.



Lewis M. Swoap
Erie



B. F. McDermott
North Western

Lewis M. Swoap, 64, who was recently promoted to engineer maintenance of way on the Erie at Youngstown, Ohio (RT&S, Aug., p. 10), was born at Kane, Pa., and graduated from Allegheny College in 1917 with a Bachelor of Science degree in mathematics and engineering. He entered the service of the Erie in 1918, serving as transitman, chief of corps, assistant engineer and assistant division engineer. Mr. Swoap served in the U. S. Army in World War I and as superintendent of transportation at Red Stone Arsenal, Huntsville, Ala., in World War II. Returning to the Erie in 1946, he was appointed office engineer at Youngstown, being further promoted to construction supervisor there in 1950, assistant division engineer at Jersey City, N. J., in 1951 and division engineer there two years later. In 1957 he was advanced to assistant to engineer maintenance of way at Jersey City. Mr. Swoap was serving as division engineer at Hoboken, N. J., at the time of his recent promotion.

Bernard F. McDermott, 52, who was recently promoted to division engineer on the North Western at Norfolk, Neb. (RT&S, Aug., p. 10), was born at Iroquois, S. D., and received his higher education at Redfield College and through correspondence courses. He entered the service of the North Western in 1926 as a track laborer, subsequently being promoted to extra gang timekeeper, assistant foreman, track foreman and roadmaster's clerk. From March 1943 to December 1945 he was in the U. S. Army, serving in the China-Burma-India Theatre of Operations. Returning to the North Western in January 1946 he was appointed acting roadmaster at Casper, Wyo. He was appointed assistant roadmaster at Clinton, Iowa, four months later and promoted to roadmaster at Brookings, S. D., in 1948. Mr. McDermott was further promoted to assistant division engineer at Milwaukee, Wis., in 1957, the position he held at the time of his recent promotion.

Henry D. Hahn, 32, who was recently promoted to assistant chief engineer of the Chicago & Illinois Midland at Springfield, Ill. (RT&S, Aug., p. 10), was born at Springfield and graduated from the University of Illinois in 1949 with a Bachelor of Science degree in civil engineering and in 1953 with a Master of Science degree in railway civil engineering. Mr. Hahn entered railway service in 1949 with the Santa Fe as a roadway assistant at Amarillo, Tex. From October 1950 to October 1952 he was in the U. S. Army, serving as rail research analyst at the Transportation Research and Development Station, Ft. Eustis, Va. In 1953 he joined the C&IM as a junior engineer at Springfield, being promoted to



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5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required by the act of June 11, 1960 to be included in all statements regardless of frequency of issue.) 6,982.

MERWIN H. DICK, Editor

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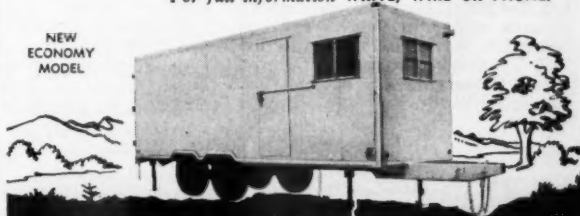
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Biographical briefs (cont'd)

mechanical engineer the following year. Mr. Hahn was further promoted to assistant engineer in 1956 and assistant to chief engineer in 1957. He was serving in the latter capacity at the time of his recent promotion.



Henry D. Hahn
C&M



Shirl A. Thompson
Sperry Products

Supply trade news

AEROQUIP CORPORATION—Richard D. Hitt, railroad sales manager, has been promoted to eastern sales manager, General Logistics Division, with headquarters at Jackson, Mich. Mr. Hitt is succeeded by William Lucht, manager of distributors' sales, Industrial Division.

AMERICAN BRAKE SHOE COMPANY—Robert L. Carmichael, formerly district sales manager for the Railroad Products Division at Houston, Tex., has been appointed district sales manager of the New York District of the division, with headquarters at New York, according to an announcement by Stephen S. Conway, president of the division. In his new position, Mr. Carmichael will be responsible for sales in the northeastern area of the United States.

DEARBORN CHEMICAL COMPANY—These sales representatives have been promoted to assistant district managers: J. W. Gill, Eastern District; C. D. Schroeder, Illinois-Wisconsin District; and W. W. Morris, Pittsburgh District.

L. B. FOSTER COMPANY—Robert M. Clementson has been appointed manager of the Cleveland (Ohio) District, succeeding Andrew M. Filak who has been promoted to manager of product research and development. Kenneth M. Schneider has been appointed to the sales office at Detroit, Mich.

NALCO CHEMICAL COMPANY—Dr. Henry R. Keyser has been appointed botanist in the company's weed control laboratory. He will work on synthesizing new herbicides and seeking new applications for existing ones.

Prior to joining Nalco, Dr. Keyser was assistant chief, Division of Noxious Weeds, Nebraska Department of Agriculture. He received a Bachelor of Arts degree from Nebraska State College, a Master of Science degree from the University of Nebraska and a Doctor of Philosophy degree from the University of Wisconsin.

An announcement states that this company is expanding its facilities for weed-control research with the construction of a greenhouse in which company researchers will broaden their study of basic plant physiology in quest of new herbicides and new applications for existing herbicides.

With the additional facilities the company expects to speed up the investigation processes required in the evaluation of weed-control chemicals. "Hard-to-grow weeds and various plants and legumes that represent noxious weed types will be raised under rigidly controlled conditions enabling researchers to more competently test and evaluate new chemicals and chemical combinations for weed control," the announcement stated.

It also said the greenhouse will be an extruded aluminum and glass structure with nearly 1100 sq ft of tray space for growing weeds and plants.

SPERRY PRODUCTS COMPANY—Shirl A. Thompson has been appointed assistant to the president of this company, a division of Howe Sound Company, according to an announcement by Frank U. Hayes, president. In his new position, Mr. Thompson will work on the promotion of new products for the railroad industry. He had formerly served with Sperry Products as sales manager of the Railroad Division. More recently he had been connected with Tamper, Inc., as vice president in charge of sales and with Thomson-Manning Corporation in a similar capacity.

SPRAY PRODUCTS CORPORATION—Kenneth B. Owings has been appointed manager, engineering, according to an announcement by Charles P. Orr, president.



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Association news

Mississippi Valley Maintenance of Way Club

The November meeting, to be held on the 14th, will feature J. J. Wright, director of research, New York Central, as the principal speaker. The meeting will be held at the Ambassador - Kingsway Hotel, 108 North Kingshighway, St. Louis, Mo. The social hour will commence at 5:30 pm with dinner starting at 6:30.

Northwest Maintenance of Way Club

The next meeting of the club will be held on November 17 at the usual location, Coleman's Cafe, 2239 Ford Parkway, St. Paul. The social hour will commence at 5:30 pm with dinner starting at 6:30. The principal speaker will be Dr. Carl H. Olson, minister of the First Universalist Church of Minneapolis. Dr. Olson's talk, entitled "Man Handling the Future," will deal with the responsibilities of supervisors.

Metropolitan Maintenance of Way Club

The second meeting of the season will be held on December 8 at the Railroad-Machinery Club, 30 Church St., New York. At the time of going to press the program had not been announced.

Chicago Maintenance of Way Club

The principal speaker at the November meeting will be W. M. Keller, vice president, research department, Association of American Railroads, who will give his impressions of the Russian railroads as obtained during a recent 30-day trip through European Russia. His talk will be illustrated by slides and moving pictures. The meeting will be held at the Hamilton Hotel, Chicago, on November 28, with the social hour starting at 5:30 pm and dinner being served at 6:30 pm.

Nominations announced for new AREA officers

As reported in the October issue, the Nominating Committee met at Chicago on September 19 and nominated a slate of officers to be elected at the convention next March. R. H. Beeder, chief engineer, system, Santa Fe, now senior vice president of the association, was nominated as president. L. A. Loggins, chief engineer, Southern Pacific Lines in Texas and Louisiana, was nominated as junior vice president. C. J. Code, assistant chief engineer—staff, Pennsylvania, now junior vice president of the association, will automatically be advanced to senior vice president.

The directors (four to be elected) are: J. H. Brown, assistant chief engineer, St. Louis-San Francisco, Springfield, Mo.; F. R. Smith, chief engineer, Union Railroad, East Pittsburgh, Pa.; L. S. Crane, assistant chief mechanical officer, Southern, Washington, D. C.; W. H. Huffman, assistant chief engineer—construction, Chicago & North Western, Chicago; H. J. Fast, coordinator of work study, system, Canadian National, Montreal, Que.; V. C. Hanna,

chief engineer, Terminal Railroad Association of St. Louis, St. Louis, Mo.; Frank Kerekes, dean of the faculty, Michigan College of Mining and Technology, Houghton, Mich.; and J. E. Eisemann, chief engineer, Western Lines, Atchison, Topeka & Santa Fe, Amarillo, Tex.

Members of the Nominating committee (five to be elected) are:

C. E. Ekberg, Jr., head, Department of Civil Engineering, Iowa State University, Ames, Iowa; C. E. R. Haight, chief engineer, Delaware & Hudson, Albany, N. Y.; C. E. Weller, assistant engineer maintenance of way, Illinois Central, Chicago; C. E. Defendorf, chief engineer, New York Central, New York; R. L. Milner, principal transportation assistant, Chesapeake &

Ohio, Huntington, W. Va.; W. D. Kirkpatrick, assistant to chief engineer, Missouri Pacific, St. Louis, Mo.; John Ayer, Jr., chief engineer, Denver & Rio Grande Western, Denver, Colo.; W. L. Young, chief engineer, Norfolk & Western, Roanoke, Va.; L. C. Collister, manager, Tie and Timber Treating Department, System, Atchison, Topeka & Santa Fe, Topeka, Kan.; and D. C. Hastings, superintendent, Potomac yard, Richmond, Fredericksburg & Potomac, Alexandria, Va.

Two standing committees have scheduled meetings to be held on November 15 in Room 1218, association headquarters, Chicago. They are: Rail, 9-12 am; Special Committee on Continuous Welded Rail, 1-5 pm.

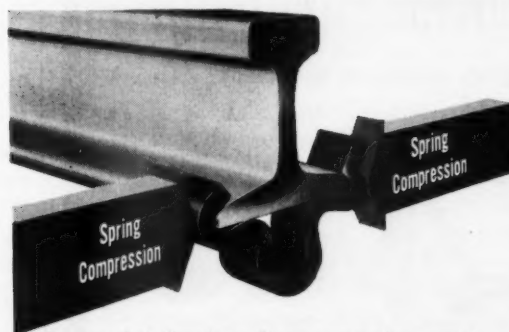
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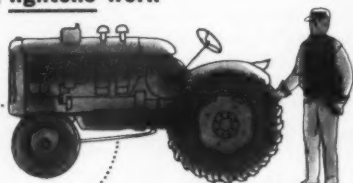
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Helps from Manufacturers

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information, write direct to the manufacturer.

CONCRETE TIES—A new edition of the booklet entitled "Concrete Railway Ties" is available. The booklet describes and illustrates the MR-1 prestressed concrete tie, including the features of the tie and the advantages of its use. A picture sequence shows the method and equipment used to install the ties in track. A drawing is included which shows the manner of fastening rails to the concrete tie. The booklet also describes the tie-casting machine developed for the mass production of concrete ties, summarizes the results of laboratory tests on the ties, plates, and fastening, and lists the materials required to install one concrete tie, including the cost of each item and where each can be obtained. (Write: American Concrete Crossite Corporation, Dept. RTS, 56th St. & ACL RR, Tampa, Fla.)

PERFORATED PIPE. The advantages of perforated corrugated pipe for subdrainage systems are described in a new catalog. Illustrations point out the manner in which perforated pipe is installed. The catalog also describes the manufacturer's new universal joint and its new line of wedge fasteners for speeding up pipe installation and reducing material cost. (Write: Armco Drainage & Metal Products, Inc., Dept. RTS, 9360 Curtis St., Middletown, Ohio)

WEED AND BRUSH CONTROL. A new four page folder entitled "Chemicals and Services for the Railroad Industry" is available. Designated Bulletin 601, the folder describes Nalco's services and chemicals for weed and brush control, including surveys and spraying. Herbicides H-174 and H-178D are described in detail. The folder also gives information on other Nalco products, including flange lubricators, water treatments and fuel-oil treatments. (Write: Nalco Chemical Company, Dept. RTS, 6216 West 66th Place, Chicago 38.)

CONTINUOUS WELDED RAIL. The Thomson-Manning process of butt welding rails into continuous strings is described and illustrated in a six-page folder. A picture sequence shows the various stages of the production line. The advantages and economy of continuous welded rail are pointed out. A chart is included which compares the cost of a welded joint to an angle-bar joint. (Write: Thomson-Manning Corporation, Dept. RTS, Castleton, Vt.)

EARTH DRILLS. A 12-page booklet is available which describes and illustrates the Ka-Mo line of equipment for horizontal, vertical or angular drilling and boring in earth and rock. A large number of photographs show the equipment in use on various kinds of jobs. Several charts are included which give data and specifications on drills, power requirements, hand-feed track units and power-feed track units. The booklet also describes Ka-Mo cutting heads. (Write: Kwik-Mix Company, Ka-Mo Tools Department, Dept. RTS, Port Washington, Wis.)

CRANE-EXCAVATOR. The features of the new American 900 Series crawler crane-excavator are described in a catalog now available. Designated 790-CG-1, the catalog points out that the new air-controlled 900 is in the 3½ to 4½-cu yd class, has a rated lifting capacity of 110 tons and is capable of handling boom lengths up to 270 ft plus jibs. The component parts of the machine are described and illustrated. Photographs show the 900 equipped with hook, backhoe and dragline. Optional equipment available for use with the machine is listed. (Write: American Hoist & Derrick Company, Dept. RTS, St. Paul 7, Minn.)

HYDRAULIC WATER RAM. A 4-page folder is available which describes the features of the Hydraulic Water Ram. It explains with the aid of drawings how the ram uses hydrostatic impact through the release of a charge of compressed air to clean pipes, drains and sewers. The principles of hydraulics and kinetic energy used by the ram are described. (Write: Hydraulic Manufacturing Company, Dept. RTS, 138 Hurd Ave., Bridgeport 4, Conn.)



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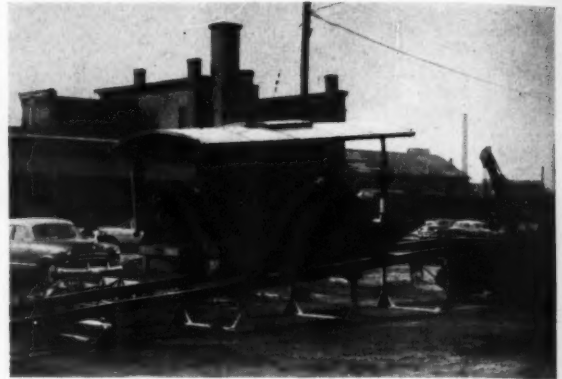


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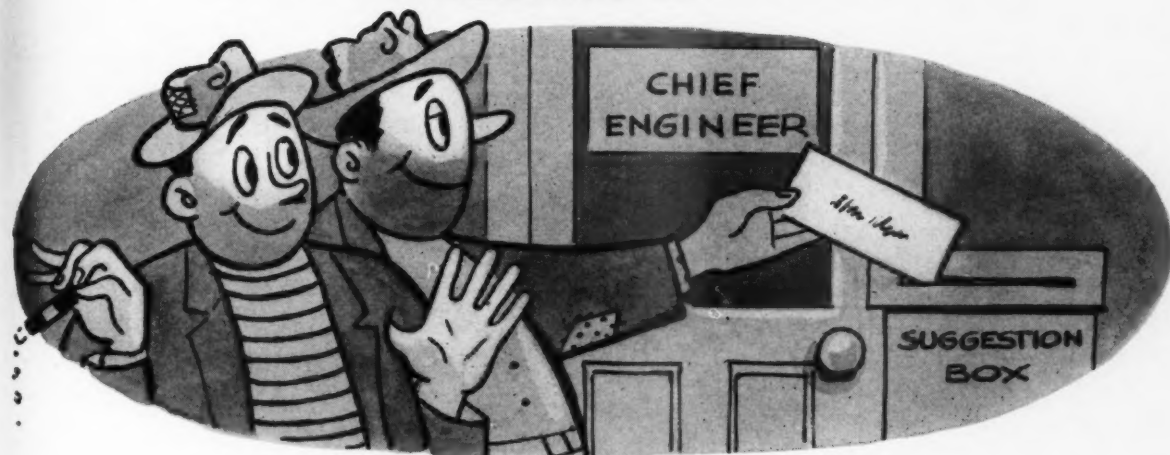
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